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# USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

## CYBERNETICS, COMPUTERS, AND AUTOMATION TECHNOLOGY

No. 25

This serial publication contains abstracts of articles from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. DEVELOPMENT AND PRODUCTION OF  
COMPUTERS AND CONTROL EQUIPMENT  
A. General Treatment

USSR

UDC 681.3.001.1:62-52

PRANGISHVILI, I. V.

BASIC TRENDS IN THE DEVELOPMENT OF CONTROL COMPUTER TECHNOLOGY

IZMERENIYA, KONTROL', AVTOMATIZ. NAUCH-TEKHN REF SB [Measurements, Monitoring, Automation. Scientific and Technical Abstract Collection] in Russian No 1(3), 1975 pp 43-50

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKNIKA No 5, 1976 Abstract No 5B5]

[Text] The author examines the basic trends in the development of control computer technology and the features of computer systems of different generations. Computer systems of third and fourth generations are compared with respect to their basic characteristics. The author discusses the architectural features of third and fourth generation computers. Special attention is paid to the design of multi-processor computer systems. The author discusses the methods of increasing the effectiveness of hardware and programming tools. He examines questions of using mini- and micro-computers and computer networks. He introduces the concept of generations 1/2

USSR

PRANGISHVILI, I. V., IZMERENIYA, KONTROL', AVTOMATIZ. NAUCH-TEKHN REF SB No 1(3), 1975 pp 43-50

for computer networks and discusses the structural features of a computer network for collective utilization and the possibility of information transmission channels. References 5. Author's abstract.

USSR

UDC 681.322

PRANGISHVILI, I. V.

PROSPECTS OF DEVELOPING CONTROL COMPUTER TECHNOLOGY

MIKROELEKTRONIKA [Microelectronics] in Russian Vol 4, No 6, 1975 pp 477-485

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNIKA No 5, 1976 Abstract No 5B238]

[Text] The author examines the trends in developing control computer technology. He cites the characteristic features of digital computer systems of the third and fourth generations. He discusses the prospects of using large microelectronic and optoelectronic circuits in fourth-generation systems for hardware implementation of the processes and their software. References 3. Author's abstract.

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USSR

GLUSHKOV, V. M., KUSHNER, E. F. and STOJNIY, A. A.

FUNCTIONAL STRUCTURE AND ELEMENTS OF COMPUTER NETWORKS

UPRAVLYAYUSHCHIYE SISTEMY I MASHINY [Control Systems and Machines] in Russian  
No 3, 1975 pp 1-10

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11, 1975 Abstract No 11V832 by the  
authors]

[Text] This article is dedicated to a new trend in the utilization of computer equipment -- computer networks. The prerequisites for their development and their advantages over the use of local computer systems are noted. The architecture of computer networks is presented, components of its elements and their functional purpose are analyzed. Certain requirements are formulated for the software of computer networks, and networks are classified as to structural, functional and information characteristics. 12 References.

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USSR

PROGRAMMING IN THE 1980's (A POSITIONAL ADDRESS AT A PANEL DISCUSSION.  
IFPI-74 CONGRESS)

Novosibirsk SISTEM. I TEOR. PROGRAMMIR. [Systems and Theoretical Programming]  
in Russian 1974 pp 12-15

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11, 1975 Abstract No 11B722 by  
N. Balyberdina]

[Text] This report contains an analysis of the main trends in the development of modern programming and a prediction of its status in the 1980's. It is noted that systems programmers will be required to create an entire arsenal of preprocessors and metaprocessors, which will represent a significant fraction of software. The accent in programming will be shifted in the direction of data bases, and programming will be interpreted as an open process of interaction between the author of the problem and the data, which have their own life and development in the machine. In the area of training of personnel, the author considers it important to retain the university nature of education. In this aspect, training of personnel in the mathematics of computation and the understanding of the social role of information processing must be clearly presented.

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## CZECHOSLOVAKIA

BIRYUKOV, I., Pravda's own correspondent, Prague

### ACHIEVEMENTS OF INFORMATION SCIENCE IN CZECHOSLOVAKIA

Moscow PRAVDA in Russian "Masters of the Information Flow: the Know-How of our Friends" 27 Jul 76 p 4

[Text] When specialists put calculating and computing machines to work they say they are "bringing them to life." The Czech engineers and their colleagues from Dresden and Leipzig who had built the up-to-date computer--one of the unified system of the CEMA countries--for Czechoslovakia had gathered for precisely this purpose, to put life into a complex machine. In a large windowless room bathed in bright neon light a group of people huddled over drawings.

"There is the heart of our new technological base," said Jaroslav Volny, general director of the Central Administration of Scientific, Technical, and Economic Information in Prague.

This is where scientific-technical and economic data from the entire republic, from all spheres of national production which have their own  
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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

sectorial subsystems, converge. The subsystems, in turn, are fed data by the enterprise computing centers. Of course, all plants do not have such "shops," but on the other hand a few large enterprises like the Skoda Combine are themselves performing the functions of sectorial subsystems. The breadth of the network is illustrated by the bare fact that more than 1,000 information centers on different levels are already operating in Czechoslovakia.

When the technological base is fully operational the flow of information sent here will be even greater; it will begin to satisfy the hunger of Czech information consumers for exact, objective, timely data. Already today industry receives up to 100,000 different pieces of data from here each year.

Comrade Jaroslav Volny, director of the largest information system in the republic, spoke of the problems and prospects for development of information science in Czechoslovakia. The subjects of searching and finding, problems and achievements were touched on. The Communist Party and the Government of Czechoslovakia gave scientists and specialists a problem of paramount  
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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

importance: set up an automated system for the collection, processing, and dissemination of information. It will have to merge the three presently separate information flows: scientific-technical and economic information, socioeconomic information, and, lastly, planning information. To achieve this, a state program to introduce information science into 18 sectors of production and various spheres of public life is being introduced.

"The pace of scientific-technical progress in the world is picking up," Comrade Volny says. "The achievements of science and technology are being more and more widely applied, and the demand for information is growing correspondingly. It is becoming one of the main foundations on which a qualified approach to planned furtherance of the scientific-technical revolution is built.

After the 15th Congress of the Communist Party of Czechoslovakia, which set forth the demand that the achievements of scientific-technical progress in other countries be used better, the general director continued, "We rethought our tasks. We are striving to improve the quality of information and differentiate it better. There must also be refinement of analytical

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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

methods of processing data and a gradual transition to up-to-date computing hardware. It has been established, for example, that a researcher spends up to one third of his efforts today on preparations for performing the given assignment, which really means gathering preliminary information. Our system is expected to rapidly familiarize the researcher with the present state of completed investigations in the particular sphere, with patents, licenses, and other material. And we have in mind here not just scientific research but also administrative workers. So we have an opportunity to conserve substantial amounts of creative work time for our society. After all, the people who need the information are mostly directors of research and managers. It had already been proven that preparation for and reaching a decision is above all an information process."

From the main room we went to the place where the programmers and analysts will work. Comrade Jan Nesicky, director of the technological base, and his deputies, the young engineers Rudolf Vlasak and Mihal Serb, talked about development of the unified software system. The general director quite deliberately called it the greatest achievement of Czechoslovakian information science. What is it? In brief, it is a procedure for combining data submitted by the information services of different countries.

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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

"Exchange of information on the international level is essential," the engineer Nesicky explained. "But there are certain prerequisites for this: magnetic tapes standardized according to a single model as information carriers, uniform technology and a standard form for recording data on magnetic tape, and, lastly, an international standard for the description of separate types of information. Our software makes it possible to accomplish this. We will process data from several Western information services--in chemistry and machine building, in electrical engineering and the petroleum industry. But these data are incompatible not only with our system but among themselves. So we process them according to a standardized system, translating them into our recording structure."

Rudolf Vlasak brought the discussion back to its starting point: the information users.

"From the entire bulk on incoming data we must pick out what is most important, exactly what the users need. We are serving up to 500 organizations in Czechoslovakia as well as in the Soviet Union, Poland, and Romania. So we collect and generalize their queries, which are submitted on punched  
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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

cards. Then we compose a standard array from them and after that the information coming to us on magnetic tape is processed by profiles, in other words, in accordance with the interests of our clients. We send out information on the queries. The method of selective dissemination of information is efficient," Jan Nesicky added.

The standardized software system is the pride of Czech information science. It was developed by specialists at the main administration of scientific, technical, and economic information in Prague in 1972-1973, and the general director is absolutely right to call it their greatest achievement. Sufficient testimony to its value is seen in the fact that just one year after it was developed, the International Center for Scientific-Technical Information in Moscow adopted it.

In Czechoslovakia the search goes forward in many areas, but the main goal is to help society know itself better, to express various aspects of scientific-technical and economic development in the language of numbers and characters so that people will have better access to specialized  
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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

knowledge. Here are a few examples of effective participation by information science in solving important problems. Who keeps track of the effectiveness of scientific-technical ties on a nationwide scale, where is it done and in what form? They spent 18 months at the Prague information center seeking a concrete answer to this question; finally they set up a specialized subroutine for information on business trips abroad. There is now a quarterly bulletin which tells not only who went where and for what purpose, but also what scientific material they brought back and where it is kept. Such a system helps to avoid unnecessary duplication and scattering of efforts.

Some highly useful specialized subroutines are among the Czechs' scientific-technical achievements. There is a license subroutine which covers the CEMA countries; a subroutine for scientific-technical activities being pursued abroad, a subroutine for scientific research work and dissertations completed in Czechoslovakia and the other CEMA countries.

The "electronic table," which, to be more precise, is a system of electronic indices of the use of plastics, is another advance by the workers of the Czech scientific-technical information service. Using it, a design engineer can

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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

determine, without losing time, which of 200 polymers should be chosen, for example, to replace an expensive metal in the manufacture of some particular part.

I was shown the publications which the Prague information workers prepare. They are analytic collections in a series called "Indices of the World Economy." There are many of them. One is devoted to mining, another to the problems of standardizing nuclear power installation, a third to expected growth in health needs.

The Institute of Scientific-Technical Information in Agriculture, called "Agroinform," enjoys a good reputation in the republic and elsewhere. Ota Silgan, director of the institute, related that it has been chosen as the head agency in the information system for forestry and agriculture and will act as organizer of cooperation among the CEMA countries.

Constantly improving and delving ever deeper into the "bowels" of management and the economy, the Czech information service moves confidently toward

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## CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA 27 Jul 76 p 4

the assigned goal: creating a unified state automated system which is integrated with the appropriate institutes of the CEMA countries and the International Center of Scientific-Technical Information in Moscow. And whether we talked of what has already been achieved or of prospects for the future, the Czech scientists and specialists always referred to the vitality and necessity of joining the efforts of the fraternal countries in this important area. Information science serves the common good of the fraternal countries.

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## POLAND

### MANUFACTURE OF ELECTRONIC CALCULATORS IN POLAND

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 11, No 2, 1976 p 116

[Text] A total of 23,000 electronic calculators were manufactured in the computer factory MERA-ELWRO in Wroclaw. According to plans, production will be doubled in 1976. A total of 40,000 Type 105-LN and 7,500 Type 255-1 electronic calculators will be exported. The latter type is equipped with a printer, which automatically prints the results of the operations performed on paper tape. A total of 85 percent of all components and units of the electronic calculators manufactured in the MERA ELWRO factory are made by the Polish electronic industry. (From p 16 of the December 1975 issue of ORGANIZACJA, METODY I TECHNIKA).

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## B. Problem Areas

USSR

GACHECHILADZE, D., deputy chief of the Division of Control Systems and Computer Technology of the State Committee for Science and Technology of the Council of Ministers of the Georgian SSR

### UTILIZATION OF COMPUTER TECHNOLOGY IN GEORGIA

Tbilisi ZARYA VOSTOKA in Russian ("The Computer and Its Reserves") 28 Jul 76  
p 2

[Text] The broad program of automating administrative labor and production processes which is being carried out in our country is based first of all on the use of electronic computer technology. A stable trend is now seen toward the establishment of a fully independent sector, the computations industry, which is developing at a growing rate.

The stock of computers in Georgia grew significantly during the last five-year plan; more than 20 computing centers are already operating. A republic library of algorithms and programs has been organized at the Academy of Sciences Georgian SSR and a Georgian-language terminological dictionary of computer technology has been worked out.

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USSR

GACHECHILADZE, D., ZARYA VOSTOKA 28 Jul 76 p 2

Training for specialists in the operation of computer equipment has expanded. Some 900 management workers from the republic economy have improved their qualifications and acquired skills in using computer technology at special courses organized at the State Committee for Science and Technology of the Georgian SSR Council of Ministers. There are courses to train computer programmers at the Computing Center of the Academy of Sciences Georgian SSR.

Nonetheless, computer equipment is not being used effectively enough in Georgia. Take the average 24-hour load on the republic stock of computers; it is lower than the national average. The period between the moment that an organization receives a computer and its launching into operations sometimes drags out to eight months and more, whereas the figure set by standards is four months.

The computing centers do not have enough air conditioners, assemblies of various sorts, materials, and supplementary equipment. The level of mutual information work among the computing centers now operating in the republic is still low. And we must add that Georgia still does not have enough specialists in programming and computer technology with higher and secondary education.

USSR

GACHECHILADZE, D., ZARYA VOSTOKA 28 Jul 76 p 2

A high return from computer technology is possible only where the data collection system is well organized. That is why it is already time to direct attention to improving the system of normative information and to standardizing initial documents in agriculture, land reclamation and water management, local industry, housing and municipal services, domestic services, and the Tbilisi City Executive Committee. This will create the necessary prerequisites for effective use of computer equipment.

The use of computers promises an especially large economic benefit in the sphere of industrial production, particularly in automating technological processes. And this is where electronic technology is little used in our republic.

In the current phase of development, it is impossible to use computers rationally without developing a scientifically sound supervisor system to allocate the available machine time of the republic's computers. The time has come for an enterprise which services computer equipment on a centralized basis to be set up in the republic.

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USSR

GACHECHILADZE, D., ZARYA VOSTOKA 28 Jul 76 p 2

According to the rules established by the Georgian SSR Council of Ministers, ministries, departments, associations, and individual industrial enterprises which have decided to acquire large and medium-sized computers must receive preliminary consent from the State Committee for Science and Technology. Exceptions to this rule are often made, however, and this creates additional difficulties in supplying computing centers with assembly components and other essential materials.

Unless the problem of using computer equipment rationally has been solved there is no reason to even think about a qualitative improvement in economic and technical management and securing maximum efficiency from state capital spent for the purchase and operation of this expensive electronic machinery. And this must begin with raising the level of methodological work. This problem can be solved by the Computing Center of the Academy of Sciences Georgian SSR. It is the head organization in the republic for the collection, testing, and registration of algorithms and programs and has leading specialists in the field of computer technology.

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USSR

MKHITARYAN, A., division chief, Armenian Affiliate of the Scientific Research Institute of Planning and Norms of USSR Gosplan, candidate of economic sciences, and GARAKYAN, G., senior scientific associate of the Affilifate, candidate of economic sciences; Yerevan

#### THE MEASURE OF QUALITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 May 76 p 2

[Text] One of the prerequisites for raising the quality of industrial goods is improving volume indices in both planning and evaluating the economic activity of enterprises. However, the existing system of physical planning indices does not reflect the qualitative characteristics of output.

Take the production of computers as an example. In this area the "piecemeal" approach created artificial barriers which prevent the Yerevan "Elektron" Plant from incorporating the production of Nairi-3 and Nairi-3-2 computers. For six years the plant continued producing the second-generation Nairi-2 even though they knew that one third-generation machine can replace more than 60 of the old machines.

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USSR

MKHITARYAN, A., and GARAKYAN, G., SOTSIALISTICHESKAYA INDUSTRIYA 21 May 76 p 2

And are there not many other production installations which do not have physical indices that take account not only of quantity but also the degree of usefulness of the articles being produced?

How can usefulness be determined?

Despite the difficulty of selecting measures of the usefulness of various articles (especially composite ones which are characterized by a group of quality indices), they are being used successfully for many types of output. The fuel and tractor industries and tractor machine are example enough.

To determine such measures correctly means to determine the quality factors of mutually replaceable products. To do this one type of product is singled out from a group of mutually replaceable and similar products as optimal in terms of features. Then the usefulness figure is determined (using one or several main indices). After this the usefulness of the other mutually replaceable types is measured against this standard. With these usefulness factors and the usefulness figure of the standard article the planning and actual volume indices of output are determined and the percentage of plan fulfillment for product output is computer. Needless to say, the proposed method does not

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USSR

MKHITARYAN, A., and GARAKYAN, G., SOTSIALISTICHESKAYA INDUSTRIYA 21 May 76 p 2

reject planning or keeping track of the volume of output produced in physical units.

Of course the effectiveness of the proposed method will depend largely on how well substantiated the standard unit of usefulness is. For example, if productivity is adopted as the only parameter for equipment and others are neglected, unjustified errors may occur in establishing the standard unit of usefulness. After all, a differentiated approach which depends on the purpose of the article is essential in choosing the standard unit. From this point of view output may be broken into two groups. First, there are the articles whose usefulness can be assessed by one basic parameter. For a cutting tool it will be hardness, for example. Second, there are the articles whose usefulness is described by several parameters. An example would be productivity, reliability, and repairability in equipment.

This proposal can only be realized if planning agencies and industrial ministries join their efforts. This is where we have concentrated the scientific research organizations which are capable of working out scientifically substantiated standard units of product usefulness and interrelationships for  
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USSR

MKHITARYAN, A., and GARAKYAN, G., SOTSIALISTICHESKAYA INDUSTRIYA 21 May 76 p 2

groups of similar and mutually replaceable articles, and then working out physical evaluative indices. As they become ready they can be tested on an experimental basis at a series of enterprises or industrial subsectors.

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USSR

MOISEYEV, N., corresponding member of the USSR Academy of Sciences

#### INTRODUCTION OF AUTOMATED PLANNING

Moscow PRAVDA in Russian 21 Jul 76 p 3

[Abstract] Computer hardware introduced in recent years permits direct dialog with the computer, rapid correction of errors, making changes in plans and otherwise utilizing the growing capabilities of computers, especially in planning. The automation of planning is not a simple matter, but requires reorganization of planning, changes in the qualifications and orientation of specialists, a higher level of interdisciplinary thinking and thorough scientific investigation. The introduction of automated planning systems is being delayed by psychological factors--many people know something about computers and how to operate them, but not many realize the difficulties to be overcome in their introduction. Another reason is technical--far more powerful computers will be produced in time, but work must not be put off until they appear, for those we now have permit doing a great deal. It also is necessary to solve problems in the training of specialists in the use of computers, programmers, planners and constructors of automated planning systems--a new kind of specialist. Certain work has been done  
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USSR

MOISEYEV, N., PRAVDA 21 Jul 76 p 3

already. Widely known is that done by the USSR Academy of Sciences computer center and the Institute of Cybernetics of the Ukrainian SSR and Belorussian SSR Academies of Sciences on the automation of the planning of technical systems. The Leningrad computer center of the USSR Academy of Sciences has begun to study regional programs of development oriented toward the north-western part of our country. Investigations having the goal of creating methods of planning large ecological and economic systems can be developed on the basis of the work of the Institute of Mathematics and Mechanics and the Institute of the Ecology of Plants and Animals of the Ural Scientific Center of the USSR Academy of Sciences. The East Siberian Branch of the Siberian Department of the USSR Academy of Sciences has excellent possibilities for system investigations in the areas of power engineering and the planning of natural complexes, etc., but these organizations must be reinforced organizationally and materially. Perhaps branches of those institutions should be opened up in some university centers.

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## C. Production Plants

USSR

### MINSK COMPUTER PLANT WINS AWARD

Minsk SOVETSKAYA BELORUSSIYA in Russian ("Awards to Creators of Computers")  
5 Sep 76 p 3

[Text] The Minsk Order of Lenin Plant of Electronic Computers is 20 years old. It would seem that such a length of service does not constitute such a long life for an enterprise, but what a truly fantastic leap forward has been made by the Minsk computers: from the M-3 (30 operations per second) to the YeS-1060 (two million operations per second). The former plant of mathematical machines has grown into a powerful industrial association for the production of computer technology. Thanks to this, and because of the international division of labor within the framework of CEMA, Belorussia has become a major producer and exporter to many countries of electronic computers.

For its significant contribution in supplying modern computer technology to the national economy and for the achievements it has attained in improved production and increased quality of its output, the plant was awarded a Certificate [pochetnaya gramota] of the Supreme Soviet Belorussian SSR. At the triumphant meeting which took place on 3 September, V. Ye. Lobanok, deputy chairman of the Presidium of the Supreme Soviet Belorussian SSR,  
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USSR

SOVETSKAYA BELORUSSIYA 5 Sep 76 p 3

presented the award to the staff of the enterprise. He also presented government awards to a large group of the plant's workers.

The triumphant meeting for the computer creators was also attended by I. M. Glazkov, deputy chairman of the Council of Ministers Belorussian SSR, and V. I. Kritskiy, head of a section of the Central Committee of the Communist Party of Belorussia.

USSR

MANUFACTURING PLANTS NOT RESPONSIBLE FOR REPAIR OF KEYBOARD COMPUTERS

Moscow EKONOMICHESKAYA GAZETA in Russian ("Inquiry Desk--Briefly, In Essence")  
No 31, Jul 76 p 16

[Excerpt] Question by L. Kap, city of Okha in Sakhalinskaya Oblast': Is the manufacturing plant obliged to repair the Iskra-110 computer?

Answer [by the USSR Ministry of Instrument Building, Means of Automation, and Control Systems]: For the purposes of improving the quality of electronic keyboard computers, it has been decided to consolidate their production. Accordingly, the output of the keyboard computer Iskra-110 at the plant in the city of Tbilisi is being terminated. Questions concerning the repair and maintenance of these machines should be addressed to the Biysk Experimental Plant "Spetsavtomatika": 659316, Biysk, 16 Altayskiy Kray.

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## D. Unified System or Ryad Series

USSR

### STANDARDS OF THE UNIFIED SYSTEM OF COMPUTERS

Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 76 p 15

[Text] The development of the Unified System of Electronic Computers [YeS EVM] within the framework of the Council of Economic Mutual Assistance was carried out on the basis of extensive standardization and the creation of technical-norms documentation that takes into account the possibility of future use of an automated design system.

In the process of the work, a basic underlying standard for technical-norms documentation, to be used in the design of the Unified System of Computers, was established. This made it possible to solve the problem of technical, code, and program compatibility between the computers, which is especially important in connection with the construction of automated control systems.

All such conditions during the creation of the Unified System were taken into account in the standards for the overall technical requirements.

The peripheral units of the Unified System were developed in accordance with the requirements of national and international standards. Thus, in the  
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EKONOMICHESKAYA GAZETA No 35, Aug 76 p 15

accumulators with interchangeable magnetic discs, a standard six-disc package was used, as recommended by the International Organization for Standardization [ISO]; it is applicable to all of the modern computers of the third generation.

The further development of the Unified System of Computers calls for, in particular, increasing the speed of the machines, creating and improving peripheral equipment, and improving software.

## E. Hardware

USSR

MELIK-PASHAYEVA, A., Novosibirsk

RESEARCH ON HOLOGRAPHIC MEMORIES

Moscow IZVESTIYA in Russian ("The Computer 'Thinks' by Associations")  
5 Sep 76 p 4

[Text] On a photographic plate whose dimensions are one fourth of a sheet of newspaper, diversified information has been transcribed that would scarcely fit into hundreds of encyclopedia volumes. In the semi-darkness, green patches of light shimmer mysteriously: the contacts of the laser beam upon the plate are almost imperceptible to the eye...

A routine experiment is in progress in the Laboratory of Optic Methods of Information Processing of the Institute of Automation and Electrometry, Siberian Department of the Academy of Sciences USSR. The researchers are "testing" the associative modes of a holographic memory. All this time the task of the chemists has already been worked out: an organic compound has been synthesized -- is it a new one?

Data on the spectral characteristics of the substance are entered into the holographic memory, which has to remember them, while it simultaneously  
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MELIK-PASHAYEVA, A., IZVESTIYA 5 Sep 76 p 4

and rapidly isolates groups of related compounds with similar spectra, which have been written on the plate earlier.

This is a step toward "associative thinking" on the part of a computer. If it provides successful, then use of holographic methods of processing, storage, and retrieval of information as affiliated with the automation of all information-reference service, library affairs, medical and technical diagnosis, as affiliated with the solution of astrophysical and numerous other problems, will be accelerated hundreds and even thousands of times. The operational qualities of ordinary electronic computers will be enhanced.

This work is being carried out jointly with specialists of the Inter-industry Department of the Instrument Building Plant imeni Lenin, where even today the first industrial model of a device with holographic memory for the solution of problems of this nature is being created.

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USSR

SHVARTS, K., corresponding member of the Academy of Sciences Latvian SSR and deputy director of the Institute of Physics, and FRITSBERG, V., head of the problem laboratory of ferroelectrics of the Latvian State University imeni P. Stuchka

#### IN SEARCH OF OPTICAL MEMORY

Riga SOVETSKAYA LATVIYA in Russian 1 Jul 76 p 4

[Text] In the last decade optical methods of data processing have been finding increasing application in computer technology. This requires new procedures for converting and recording the optical signal, the so-called "electronic eye" and "electronic brain" for optical computers. This problem is being resolved by new branches of science, optical electronics and radio optics, which stand at the junction of optics, electronics, and cybernetics. The subject of optical electronics is the problems of light in interaction with charge carriers--with the electrons in optical and electronic devices designed for recording, transmitting, processing, and displaying information. Radio optics generalizes optical and radio engineering methods of converting signals, which is to say it combines optics, radio engineering, and information theory.

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USSR

SHVARTS, K., and FRITSBERG, V., SOVETSKAYA LATVIYA 1 Jul 76 p 4

Holographic methods of recording and converting signals play a very large part in radio optics. This is one of the many applications of holography, a field of great interest for all branches of science and technology. The laser beam is split in two. One beam illuminates an object, is reflected from it, and strikes an optical crystal. The other is sent against a mirror and, after being reflected, also strikes the same crystal. The meeting of the two beams on the surface of the crystal is the moment when the information is recorded. All the information recorded on the crystal can be read by means of light by simply directing a laser beam at the crystal.

Latvian physicists are also working on the problem of creating new materials for optical electronics. They are specialists in solid state physics from the Institute of Physics of the Academy of Sciences Latvian SSR and associates from the Problem Laboratory of Ferroelectric Physics of the science center of the Latvian State University imeni P. Stuchka.

Pattern recognition by optical methods is the decisive element in human communication with the computer. Pattern recognition, or optical filtration, makes it possible to select and classify the most diverse data and is thus applicable in virtually all branches of sciences and technology. The

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USSR

SHVARTS, K., and FRITSBERG, V., SOVETSKAYA LATVIYA 1 Jul 76 p 4

essence of optical methods is the fact that laser light can be focused to a very fine beam whose diameter is comparable to the wave length of light (about one micron or one ten-thousandth of a centimeter). Laser light has a number of special properties, one of which is coherence; this means that it consists of waves of the same frequency which move in an orderly fashion in a single direction. This is fundamental for recording information in the form of holograms and for using light in pattern recognition.

From the vast range of problems in optical electronics Latvian physicists have received the task of developing new optical recording media for data recording and processing. New light-sensitive materials make it possible to receive an optical image immediately, without the chemical processing typical of conventional photography. Modern electrooptical materials, for example ferroelectrics, make it possible to receive an image through the action of instantaneous electric pulses.

It is entirely natural that the efforts of scientists from the two labs be joined. Solving the problem of optical recording media demands knowledge of the processes of interaction between light and matter, the nature of

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SHVARTS, K., and FRITSBERG, V., SOVETSKAYA LATVIYA 1 Jul 76 p 4

defects in crystals and changes in them when acted on by light, the effect of external fields, temperature, and so on. In addition, this problem also demands special investigations of holography, which today is the primary method of processing information for optical electronic systems.

New information carriers, optical memory based on ferroelectrics, are being developed through the joint efforts of scientists at the university and the institute. This class of crystalline materials is convenient in that information can be recorded on it by light in the presence of an external electrical field, which greatly increases recording efficiency. Physicists at the institute are using niobate monocrystals as the optical memory on which information is recorded by a beam of light; scientists at the university laboratory are using translucent ceramics based on solid solutions of zirconates and lead titanates. These materials can be used for optical data recording and also for light modulators in so-called electrooptical cells.

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SHVARTS, K., and FRITSBERG, V., SOVETSKAYA LATVIYA 1 Jul 76 p 4

The overall plan of joint work by the two scientific institutions also includes pure research on photophysical processes in ferroelectrics, theoretical calculations, and applied projects. Joint development of new materials for optical electronics is one of the most important tasks of solid state physics, which is making its contribution to the development of computer machinery with optical memory.

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USSR

IL'ICHEVA, S.

TELEVISION ANALYZER DEVELOPED IN LATVIYA

Riga SOVETSKAYA LATVIYA in Russian ("The Eyes of the Electronic Machine")  
12 Aug 76 p 2

[Text] "Before a test pilot takes off in a new plane an unmanned craft is flown. It stays up quite a long time while its flight performance is studied from the ground in order to find ways to improve it," said academician E. A. Yakubaytis, stopping by a complex cybernetic machine. We paused by the wide open front panel of the machine, which revealed a set of integrated circuit units with intricately interwoven wiring. This was a new videosystem recently accepted by the interdepartmental commission and recommended for series production at one of our country's plants.

The director of the Institute of Electronics and Computer Technology of the Academy of Sciences Latvian SSR needed this comparison with aircraft testing to explain why the front panel of the machine is never closed. This experimental model will always remain at the institute; it will be studied and further refined through adjustments which are suggested by developing scientific-technical thought.

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IL'ICHEVA, S., SOVETSKAYA LATVIYA 12 Aug 76 p 2

A few years ago the institute built the first variation of a television analyzer of the structure of an image. This was the well-known TASI [Tele-vizionnyy Analizator Struktury Izobrazheniya; television analyzer of the structure of an image], which was designed for diagnosing oncological illnesses. The process of investigation for the TASI, which is still used at the republic oncological dispensary today, began from a television microscope which, unlike the usual light sensor, has a television sensing device. A cytological preparation taken from the area of the human organism being examined is placed under the lens of this microscope. The cluster of cells seen by the microscope is projected onto the screen. The television sensor converts the videosegments into electrical signals and sends them to a logical automaton. In a matter of seconds that device measures the geometric parameters of the cells. The automaton divides the cells into normal and abnormal according to these parameters.

After the TASI, several similar devices for different applications, and using different names, were built at the Laboratory of Television Diagnosis. One of the modifications was awarded a gold medal at an international fair in Bulgaria. The video terminal from this same series was displayed early 2/6

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this year in the Soviet exhibition in Milan. Each of these devices differed from its predecessors by a definite degree of refinement.

By the time that members of the interdepartmental commission arrived at the institute in July of this year, scientists there had already accumulated considerable experience in working with television analyzers. It has turned out that devices of this type can be for general purposes and perform several functions, not just one, and their application is not limited to medicine. Botanists are using them to classify plants by their leaves, astronomers use them to analyze segments of the skies, in metallurgy they have proved suitable for analyzing microsections, geologists use them to study the texture of rocks, and so on. If the fully equipped device is connected to a computer the result is a complete videosystem, and the machine acquires electronic eyes. It can record an instant by means of photographic camera, look into the microworld with the microscope, and display it on a television or printing unit.

My hosts suggested that I pause for a minute in front of the camera, in front of its emotionless glass eye. At the same moment my image appeared in the video system. Engineer Gennadiy San'kov pressed the indicators of 3/6

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IL'ICHEVA, S., SOVETSKAYA LATVIYA 12 Aug 76 p 2

the logical automaton and a frame appeared around my portrait. This made the work of the logical unit easier, because it began converting from electrical to video only those signals outlined by the frame on the screen. The logical unit performed its function in a moment and through the adapter (interface) transmitted the converted signals of my image to the big M-4030 electronic machine.

I watched my electronic portrait being printed, listened to the precise clicking of the printer, and thought how simple and, at the same time, incomprehensibly intricate the functioning of this new video system is, a system that can feed an image to an electronic computer. And what a vast range of problems it can handle!

The period of work spent on the machine was minimal. The State Committee on Science and Technology of the USSR Council of Ministers assigned the institute to begin research on building multimachine complexes. And in just one year the video system was developed by several institute laboratories together. One lab, directed by G. Gromov, developed the units for converting the television signals. A Baums' lab developed the units for converting

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IL'ICHEVA, S., SOVETSKAYA LATVIYA 12 Aug 76 p 2

video signals into discrete signals. A third lab headed by V. Red'ko built the adapter itself, the device for communication between the video system and the computer. Optical instruments can be connected to the video system, and the system itself can be plugged into the computer. An appropriate computer, mini, micro, or macro, can be picked out depending on the concrete objective set before the system (simple, complex, intermediate).

The interdepartmental commission, which included representatives of various departments, ministries, and plants, noted that there are no other systems like this one in the USSR and recommended it for series production in three modifications. That in itself is exceptional. After all, it is commonly known that the path from a scientific invention to series production at an enterprise is usually a long one. And if it was greatly reduced in this case, credit goes first of all to the scientists who were able to realize their intention at the level of the most up-to-date ideas and to the production workers who have a "feel" for new ideas.

The front panel of the laboratory model of the logical unit of the system will always be open, for engineering cybernetics will continue to progress.

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IL'ICHEVA, S., SOVETSKAYA LATVIYA 12 Aug 76 p 2

Possibly unforeseen problems will arise that can be handled by the video system and its units, which convert television signals into discrete signals, center an image on a television screen, put a frame around it, and interconnect the whole system with the computer. Possibly there will be new units for purposes which we today cannot even imagine.

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USSR

ISKRA-125 KEYBOARD COMPUTER

Moscow NAUKA I ZHIZN' in Russian ("Technology on the March") No 9, 1976 p 47

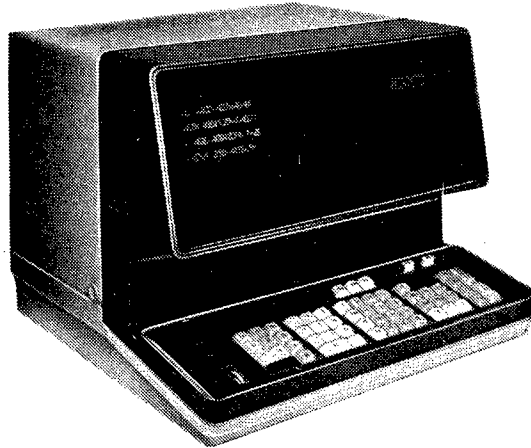
[Excerpt] The Iskra-125 program-controlled keyboard computer is designed for engineering-technical and mathematical computations. In addition to the four arithmetic operations, it can perform reverse division, raising to a power, extraction of roots, computation of trigonometric functions, hyperbolic functions, and natural logarithms, conversion of degrees to radians and vice versa, etc. It can compute with 12-digit numbers. Programs are input to the computer with the aid of magnetic cards. The results of computations may be output on a printer, a display screen, or on a graph plotter. The Iskra-125 consumes no more than 150 watts; its mass is approximately 25 kilograms.

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NAUKA I ZHIZN' No 9, 1976 p 47



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USSR

ARUTYUNOV, O. S., deputy chairman of the judging committee of the competition

#### KEYBOARD COMPUTER WINS PRIZE

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian ("The Best Developments of the Year") No 1, 1976 pp 63-64

[Excerpt] The Iskra-125 programmed-controlled keyboard computer has been awarded one of four third prizes in the 1974 competition for the Prize imeni S. I. Vavilov for the creation of scientific research instruments, devices, and systems. The competition is sponsored annually by the central board of directors of the Scientific-Technical Society of the Instrument Building Industry imeni Academician S. I. Vavilov. The Iskra-125 was created by the State Union Design-Technological Bureau for the Design of Calculating Machines in Leningrad. In addition to performing computations, it can serve as the basic computer in local measuring systems and as the central link in systems to control the course of an experiment. With the use of the Iskra-125, the labor productivity of scientific and engineering-technical workers is 1.8 and 4.2 times higher respectively than with the use of the keyboard computers Elektronika S-50 and Promin'-2, which are similar in purpose. Associated with this is a cost that is 1.9 and 2.7 times lower, respectively.

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USSR

OBKHODOV, V., engineer

#### MICROCOMPUTER GOES ON THE MARKET

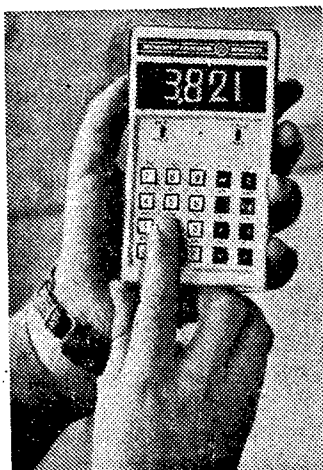
Moscow PRAVDA in Russian ("A Computer in a Single Crystal") 28 Aug 76 p 2

[Abstract] Series production of the Elektronika BZ-18A microcomputer has been mastered and this eight-digit engineering microcalculator has been put on the market. In addition to the four basic arithmetic operations, the "Elektronika BZ-18A" can compute natural and base-ten logarithms and anti-logarithms, trigonometric and inverse trigonometric functions, plus roots, powers and reciprocal values of any real numbers. The microcomputer's memory registers expand its capabilities and facilitate the solution of complex problems. It is based on a large semiconductor integrated circuit which contains more than 10,000 electronic elements and makes possible the small dimensions of the "Elektronika BZ-18A" (160 X 90 X 46 mm) and its weight of less than 400 grams. It can operate with alternating current or from built-in batteries.

In the [smaller] photo: the microcomputer. [The larger photo comes from the front cover of the journal Nauka i Zhizn (Science and Life), No 10, 1976.  
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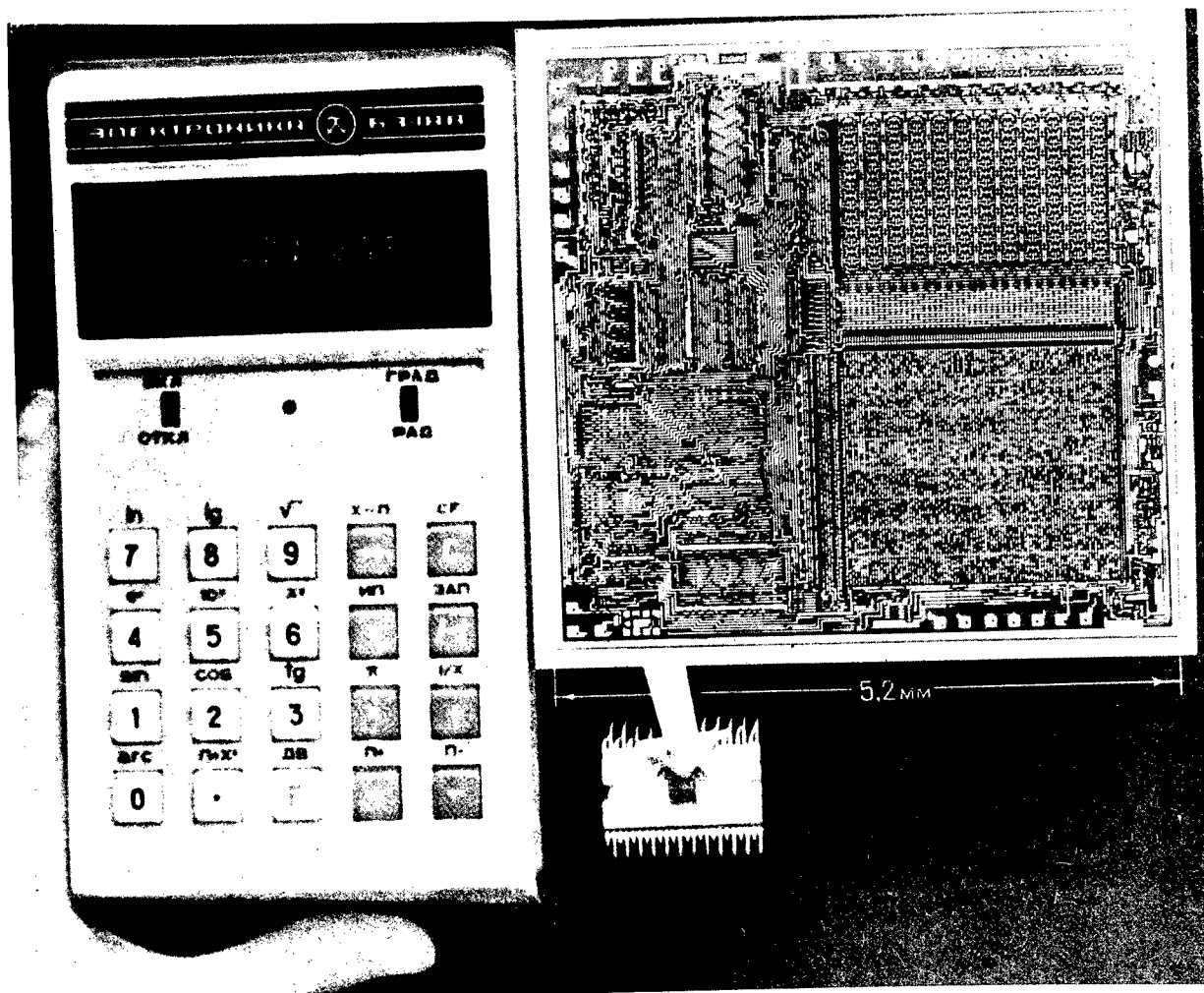
OBKHODOV, V., PRAVDA 28 Aug 76 p 2



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USSR

OSKHODOV, V., PRAVDA 28 Aug 76 p 2



USSR

UDC 681.3-181.4:528.06

BALANDIN, V. N., and VOLODARSKIY, R. D.

# THE ELEKTRONIKA BZ-04 MICROCOMPUTER

Moscow GEODEZIYA I KARTOGRAFIYA in Russian No 2, Feb 76 p 47

[Excerpt] Soviet industry has incorporated series production of the Elektronika BZ-04 microcomputer, which is designed to perform simple mathematical calculations. The general appearance of the microcomputer is shown in the photograph below. The result of the computation is displayed on the top panel.

The machine performs the following operations: the simple types  $a_1+a_2$ ,  $a_1-a_2$ ,  $a_1 \times a_2$ , and  $a_1/a_2$ ; the chain types  $\sum_{i=1}^n a_i$ ,  $\prod_{i=1}^n a_i$ ,  $a_1/a_2 \times a_3 \dots + a_n$ ; raising to a power  $a^i$  ( $i$  is a whole number). In addition, the microcomputer works with constants (the "K" key) and negative numbers. Performance time is less than 0.5 seconds for all operations.

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BALANDIN, V. N., and VOLODARSKIY, R. D., GEODEZIYA I KARTOGRAFIYA No 2, Feb 76 p 47

## Basic Operating Data of the Micro-computer

Number of display positions	8
Power requirement	0.03 wt
Dimensions	118x78x20 mm
Weight	0.2 kg

Experience using the microcomputer has demonstrated that it is reliable and very convenient for topographical-geodetic calculations, especially in the field. It has definite advantages over mechanical adding machines and electrical computing machines: silent



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BALANDIN, V. N., and VOLODARSKIY, R. D., GEODEZIYA I KARTOGRAFIYA No 2, Feb 76 p 47

operation, convenient handling, and small size and weight make it possible to raise labor productivity in computations by 30-40 percent.\* The microcomputer also has advantages over table-model keyboard computers such as the ELKA-25, the Iskra-111, and others: its small size and weight, self-contained (autonomous) operation, and lower cost.

\*Larchenko, Ye. G., and Tarasik, N. Ye., "Using Keyboard Computers to Solve Geodetic Problems" GEODEZIYA I KARTOGRAFIYA 1972 No 7, pp 26-29.

3/3

USSR

UDC 621.391.246

MOLCHANOV, V. I., engineer

EQUIPMENT FOR DEPICTING DIGITAL INFORMATION ON AN ILLUMINATED INDICATOR BOARD

Moscow MEKHAIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3 (87), May-Jun 76 pp 53-56 manuscript received 5 Aug 75

[Abstract] The basic structure and design principles are described for a device which receives digital information from an M-6000 control computer and displays it on an illuminated collective-use indicator panel. The device is intended for the case where there is a need to present data directly to shop personnel who must receive and execute in orders and signals efficiently and on time in order to assure the normal course of a technological process. It can work and be used independently regardless of the presence of a control computer or can be used as part of a complex with production control modules or other computers. Technical specifications and diagrams are presented for such a device designed for the reduction and distillation shop of a titanium magnesium combine. The equipment has been incorporated in the automatic production control system. Three Russian references.

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USSR

UDC 681.14

BUGAYEV, N. N., GERNET, YE. D., GORODILOV, V. V., ZABIYAKIN, G. I., LARIONOV, K. A., ROZENBERG, A. E., and RYKOVANOV, S. N.

SOFTWARE FOR COUPLING THE M-6000 MINICOMPUTER AND YeS COMPUTERS

Riga AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, Jul/Aug 76  
pp 64-68

[Abstract] A description is given of software for coupling YeS [Unified System] computers and the M-6000 when they are linked by an input-output interface matching unit. The coupling of the YeS computers and the M-6000 is achieved by means of programs for the graphic method of access to YeS operating systems which secure input-output control, processing of M-6000 queries, and processing of errors which occur during work with the mini-computer. The coupling of the M-6000 with YeS computers is insured by the driver of the matching unit; the driver was developed with due regard for the requirements of the primary controlling system of the M-6000. The distribution of memory in the M-6000 for data exchange with the YeS computer is considered, the program requests of the M-6000 user relative to the exchange system are pointed out, and recommendations are given for drawing up user programs for data exchange between linked computers. There are two tables, one illustration, and three bibliographic entries (all Russian).  
1/1

USSR

UDC 681.3.01

KITOV, V. A., and FILYAKIN, B. N.

PROBLEMS OF REMOTE EXCHANGE OF DATA BETWEEN COMPUTERS

Moscow PROGRAMMIROVANIYE in Russian No 3, May/Jun 76 pp 82-86 manuscript  
received 23 Dec 75

[Abstract] Setting up a computing complex consisting of two or more computers entails the problem of automating the exchange of data between computers. The advantage lies in the fact that the slowest link in the data-transmission network -- man -- is eliminated, but on the other hand there are great problems involved. A set of programs must be developed making it possible to unite the individual computers into a single whole, establishing a linking arrangement whereby two third-generation computers of the same type operating on a time-sharing basis are linked with a third computer designed for message commutation. Theoretically the user of one computer can use any of the resources of another, but in practice this is not so owing to the fact that the data-transmission lines between computers have a number of flaws, such as low transmission speed and a considerable amount of deviation, resulting in the fact that in sending

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KITOV, V.A., and FILYAKIN, B.N., PROGRAMMIROVANIYE No 3, May/Jun 76 pp 82-86

considerable batches of data the time for the system to react can become inadmissibly long. But ways of developing a technique for making this type of linkup have been found. The program software for data-exchange between computers consists of programs which control terminal equipment on the physical level and provide for time-sharing and of programs which exercise logical control over data-exchange functions. The latter control the input and output of incoming messages, edit messages, process machine errors, and establish a link with the operator. One of the difficulties in creating the computer network was the development of a logical program interface between computing complexes, which was complicated by the fact that the interfaces must be different when linking the number-two computer with the first and third and the linkup and design of the computers had been planned prior to subsequent considerations. Another problem is to provide reliable operation of the program and equipment interface between computers. In linking the second and third computer this problem was solved by having the third computer send the signal for the linkup control program to change over to the reserve channel of a duplex data-transmission channel, thus relying on the operators of the third computer to control

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KITOV, V.A., and FILYAKIN, B.N., PROGRAMMIROVANIYE No 3, May/Jun 76 pp 82-86

the second's function of checking the condition of its data-transmission channel. Two data-exchange control programs, the POD1 and POD2, are used to make the interaction of two time-sharing computers possible. The POD1 appears in the internal memory of the number-one computer and the POD2 in the internal memory of the number-two when data-exchange occurs. The structure of these programs does not differ in principle owing in part to the homogeneity of the linked computers. However, the making of adjustments is difficult under actual operating conditions, owing to the large amount of equipment taking part in the interaction and the remoteness of the computers. Adjustments are made by loading both programs into the internal memory of the same computer using a special arrangement making it possible to imitate the exchange of messages between linked computers and to adjust the routine for the exchange of messages between the users of different computer terminals. Figures 3; references 2; 2 Russian.

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USSR

UDC 681.34.004

MAKSIMENKO, V. F., candidate of physical and mathematical sciences, and MARMER, I. S., engineer

#### METHOD OF COUPLING COMPUTERS OF DIFFERENT TYPES

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3(87), May-Jun 76 pp 56-57 manuscript received 24 Dec 75

[Abstract] The existence of diverse types of computers puts certain difficulties in the way of coupling them in order to utilize their capabilities and existing software more efficiently. For example, during 1975 there were nine types of computers in operation in the Ministry of Communications USSR. However, the Republic Information-Computer Center of the Ministry of Communications Ukrainian SSR has developed a simple method of radial coupling of computers of different types. The essence of the method is described, using the example of the coupling of three computers for unilateral exchange of information. If data is exchanged between two computers, the exchange of information is blocked between either of them with the other computer, and the reverse. Having received a request from one computer, the other starts to transmit a mass of data, the volume of which is determined by the first computer. The end of the transmitted mass of data is determined either by 1/2

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MAKSIMENKO, V. F., and MARMER, I. S., MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA No 3(87), May-Jun 76 pp 56-57

the operator from a panel or by means of the program. If machines with multiprogram working conditions participate in the exchange, the exchange can be accomplished simultaneously with the performance of other tasks. The method was implemented on "Minsk-22" and M-3000 computers and the high reliability and effectiveness of the method were confirmed during operation.



GRUSHETSKIY, V. V., YERSHOV, A. P., and POKROVSKIY, S. B.

A "PROCRUSTEAN BED" FOR INPUT LANGUAGES IN A MULTILANGUAGE PROGRAMMING SYSTEM

Novosibirsk "PROKRUSTOVO LOZHE" DLYA VKHODNYKH YAZYKOV V MNOGOYAZYKOVY SYSTEME PROGRAMMIROVANIYE [A "Procrustean Bed" for Input Languages in a Multilanguage Programming System] in Russian, mimeograph from the Computer Center, Siberian Department of the Academy of Sciences USSR, 1975 24 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11, 1975 Abstract No 11B58 K by N. V.]

[Text] The authors state that the Computer Center of the Siberian Department of the USSR Academy of Sciences is developing a long-range project of the design of an automated production system for the construction of translators (the BETA system), which will ensure translation from a broad range of algorithmic languages into the several languages of object machines. The basis of the system is a universal programming processor (UPP) which acts "once and forever" as the written intermediate product or "stock of the translator; when a certain input language is being implemented, prepared information about this language is introduced into this "stock" in a special way, converting the "stock" into the complete translator. Preparation of the 1/2

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GRUSHETSKIY, V. V., YERSHOV, A. P., and POKROVSKIY, S. B., "PROKRUSTOVO LOZHE" DLYA VKHODNYKH YAZYKOV V MNOGOYAZYKOVY SYSTEME PROGRAMMIROVANIYE, 1975, 24 pp

information about the input language and its introduction into the UPP are accomplished with the aid of special metaprocessors which act as a combination of the meaningful efforts of the linguist, the implementer (UPP specialist) and the formal procedures programmed on the instrument machine. These formal procedures are reduced to translation, macrosubstitution, editing, adaptation of several universal language constructions to the features of the given language, debugging for the parameters and setup of all components in the final translator block. An approximate list is given of those rules which linguist must follow who is preparing the input language for realization in the BETA system. These rules recommend to the linguist those constructions which he must detect in the implementing language and present them in the required stylistic form. In the greatest detail the authors examine the elements of the grammatical description of the languages and its semantics, as revealed by the tools of the internal language.

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USSR

GIRYA, M. G.

ON THE DEBUGGING OF PROGRAMS ON A PROGRAM-CONTROLLED KEYBOARD COMPUTER

Kiev VOPR ORGANIZ VYCHISL PROTSESSA [Questions of Organization of the Computer Process, Collection of Works] in Russian 1974 pp 8-18

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12, 1975 Abstract No 12V968 by N. Topalov]

[Text] In recent years in the USSR and abroad the stock of small computers of different specializations has sharply increased. In this article the author examines questions of selecting means of debugging programs for the new class of supersmall computers -- program-controlled keyboard computers with a structural system interpretation of the input language (PCKC); also he examines one of the possible versions of a system for debugging programs for the given class of computers. The article lists the basic possibilities which must be planned for in a system of debugging for a PCKC. Realization of several of them for the PCKC is distinguished by several features in comparison with general-purpose computers. These features are also examined in the article. Special attention is paid to the question of selecting a  
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GIRYA, M. G., VOPR ORGANIZ VYCHISL PROTSESSA 1974 pp 8-18

debugging language. In developing a language for the task of debugging for the PCKC, it is first necessary to take into account the degree of complexity of the language of information exchange between man and computer. In turn, this depends strongly on the choice of method of localization of the debugging operators. The article gives the comparative characteristics of the basic methods of localization (method of contexts, methods of strict and false coordinates). In conclusion the author describes the operators of the debugging language of one of the possible systems of debugging for the PCKC.

USSR

UDC 681.3.001:518.5

VERETENOV, V. YU., GUREVICH, M. I. and FEDOSEYEV, V. A.

THE MULTIACCESS SYSTEM "MUL'TITAYP" ON THE BESM-6

Moscow MUL'TIDOSTUPNAYA SISTEMA "MUL'TITAYP" NA BESM-6 [The Multiaccess System "Mul'titayp" on the BESM-6] in Russian, Institute of Atomic Energy, IAE-2409, 1974 16 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11, 1975 Abstract No 11B81 K]

[Text] The authors describe the system "Mul'titayp" which is designed for servicing external user control panels. Operation of the system is based on utilization of the mode of time sharing (only for input and output) and a batch mode for solving the problems. Authors' abstract.

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UDC 681.3:62-52

SAMOFALOV, K. G., doctor of technical sciences, ANAN'YEVSKIY, S. A., candidate of technical sciences, and STEBLYANKO, V. G., engineer

AUTOMATION OF THE DESIGNING OF CONTROL COMPUTER SOFTWARE

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3 (87), May-Jun 76 pp 37-41 manuscript received 4 Dec 75

[Abstract] One of the most laborious stages in the design of automated process control systems [ASUTP] is the development of special software written for specific digital control computers. Since the running of special software depends to a significant degree on the composition and functions of the systems software, the main difficulties which arise are determined to a large degree by the limited possibilities of systems software, that is, the absence of the necessary translators, the narrow set of functions for operative control of the computational process, etc. Hence, there are two possible approaches to the development of special software for digital control computers. One is to expand the functions of the systems software so that the entire process of preparing and debugging programs can be carried out directly on the control computer; the second is to transfer a large part of the program preparation to a general-purpose digital computer, that is, to develop methods to automate

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SAMOFALOV, K. G., ANAN'YEVSKIY, S. A., and STEBLYANKO, V. G., MEKHANIZATSIYA  
I AVTOMATIZATSIYA UPRAVLENIYA No 3 (87), May-Jun 76 pp 37-41

the design process. This article describes one possible variation of the later approach, given that the requirements imposed by the ASUPT consist of the need to achieve a real-time scale with a reaction time varying from tens of milliseconds to several seconds, a multiprogramming model for servicing independent input flows, etc. The basis of the proposed system is a high-level algorithmic language oriented toward the description of a sufficiently wide class of control algorithms. The system was implemented on a Minsk-32 computer and allows one to obtain ASSEMBLER-language programs on papertape for the M-6000. At the present time the system is programmed on an M-4030. References 5: all Russian.

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## II. ECONOMIC APPLICATIONS

### A. General Treatment

USSR

SVETLANOVA, E.

ECONOMIC INFORMATION SYSTEM DEVELOPED

Moscow PRAVDA in Russian ("Turning to the Machine for Advice") 6 Jun 76 p 3

[Text] The newborn fully deserves an attractive, expressive name, but one has not yet been thought of. Therefore let us agree to call the innovation INES, for "information economic system." Planners and specialists in mathematical programming and theoretical and practical workers in the area of control are coming to the Institute of Control Problems to familiarize themselves with this system. Even for those who deal with computer technology there is a great deal that is new here: the INES is a major step forward in the refinement of cybernetic systems and stands out for its breadth of functional capabilities and higher "intellectual" level.

The system is oriented to solving economic problems. But its "architecture" can be varied so that it can be used not only in economics but also in various spheres of information and reference service.  
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SVETLANOVA, E., PRAVDA 6 Jun 76 p 3

The working features of the INES have been thoroughly checked. While still in the stage of experimental operation it was used to optimize sectorial plans and to correct transportation routes. Specialists at USSR Gosplan, the gosplans of the Union republics, and numerous ministries were already showing an interest in the capabilities of the new system. Able to work flexibly with millions and even billions of different, fast-changing pieces of information, the INES can be used with profit as part of the automated system of planning calculations. It is also capable of calculating the plans of sectors and intersectorial balances, carrying on direct planning calculations, monitoring the performance of plans, and compiling statistical summaries.

There is one more important fact: it is possible to carry on an active dialog with the INES -- after reading the needed data on the television screen one may immediately give the machine assignments. Furthermore, the conversation goes on not only in codes but also in natural human language.

The system's "term bank" automatically translates any expanded concept into strict machine language; when it receives synonyms it searches for the meanings appropriate to them among those adopted for machine use. What is  
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SVETLANOVA, E., PRAVDA 6 Jun 76 p 3

more, the system is able to catch and correct errors in writing words. It has a syntactical analysis unit in its design for this function.

Queries which the INES receives go through this complex but essential preparatory route before entering the "data bank," the system's information base. Here they are analyzed and the mode of their subsequent processing is determined. The INES produces its answers with complete respect for the other participant in the dialog; it retranslates them into ordinary conversational language. The screen answer is duplicated and it is possible to receive it also on a paper tape on which the needed information is packed.

To see the INES in action we will step into a well-lighted room, a whole "city" made up of metal units, "houses" in which the electronic "thought" is living. And it is not for nothing that the designers of such "cities," the modern automated systems, call their designing work "architecture," because it combines electronics and metal so harmoniously, because the systems are so complex, even multistoried.

It remains to add that the INES which we are discussing was built in five years by a creative collective from several laboratories of the institute  
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SVETLANOVA, E., PRAVDA 6 Jun 76 p 3

and headed by doctors of physio-mathematical sciences Yu. N. Ivanov and V. V. Tokarev and candidates of physico-mathematical sciences V. L. Arlazarov and I. A. Faradzhev.

Now, let us try to start a dialog with the machine. Each person entering communication with the INES, now called a user, types in his name and puts together an instruction. The machine responds instantaneously: the words race across the screen and a table appears.

One of the developers of the system says: "The more values an economic problems involves the more difficult it is to break it down into a number of simple problems which the computer can handle. That is why the program system of the 'data bank' is one of the most complex parts of the software. By itself the computer does not do anything, but with the help of guidelines from the INES intensive work goes on in the machine....

"For example, suppose a user needs data from the 'economic indices bank.' To answer the question the INES outputs an entirely different order of data this time. Specialists give it a very obscure name: 'vertex of the next  
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SVETLANOVA, E., PRAVDA 6 Jun 76 p 3

level of the tree together with the circuit of the old vertices.' The thing is that arrays of indices are stored in what is called 'tree structure,' where several new shoots arise from each branch carrying information, and so on and so forth. This involves a fundamentally new method of organizing arrays of data which was worked out by the Institute of Control Problems. It is called the dynamic method and enables the INES to find needed data quickly by exchanges between the external, slow but large-capacity, memory and the computer's internal, high-speed, operational memory."

During work on this new system scientists have been able to work out a general-purpose language for describing economic data, which guarantees it a broad range of practical application. In sum, the INES stands in the ranks of the leaders among devices developed in our country and abroad to solve such problems.

With its ability to store economic information and operate efficiently with it the new system will be able to make a valuable contribution to further improvement of national economic control.

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## B. Bloc-NonBloc Cooperation

USSR

CHIKALOV, A. M., KULAKOV, A. A., and RAKOVSKIY, YU. I.

COOPERATION BETWEEN THE ACADEMY OF SCIENCES USSR AND THE SCIENTIFIC ORGANIZATIONS OF FRANCE

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, 1976 pp 97-106

[Abstract] This article describes the various fields of scientific cooperation between the USSR and France. One of these fields is "Automation of Information Processing and the Application of Mathematical Methods and Computer Technology to Economic Research, Planning, and Control. Information Science." Joint work on these topics was begun in 1968 under the general direction of the State Committee on Science and Technology of the Council of Ministers USSR. The participating Soviet organizations include the Central Economics-Mathematics Institute [TsEMI], the Computer Center and Institute of Catalysis of the Siberian Department of the Academy of Sciences USSR, the Institute of Physiology imeni I. P. Pavlov of the Academy of Sciences USSR, and other institutions. On the French side, the participants include the Institute of Economics and Statistics, the Board of Directors for Forecasting under the Ministry of Economics and Statistics, the Board of Directors for Forecasting Under the Ministry of Economics and Finance, the International Company for

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USSR

CHIKALOV, A. M., KULAKOV, A. A., and RAKOVSKIY, YU. I., VESTNIK AKADEMII NAUK SSSR No 8, 1976 pp 97-106

Information Science, the Institute for Problems of Information Science and Automation, the "Lionskiy Kredit" Bank, and other organizations and private firms.

Under the guidance of Academician N. P. Fedorenko and Corresponding Member of the USSR Academy of Sciences S. S. Shatalin, scientists at TsEMI are working within the framework of cooperation on the following problems: methods for scientific control of enterprises, including the creation of automated data processing systems for various fields; the use of mathematical methods and computer technology in macroplanning (industry-wide and inter-industries planning, operations research methods. Under the guidance of Academician G. I. Marchuk, the Computer Center of the Siberian Department, Academy of Sciences USSR, is working on time-sharing systems and software for them, plus numerical methods for solving large systems of functional equations in mathematical physics with the use of highly productive computers.

The Soviet Union and France exchange information and trainees and hold joint symposia. A monograph entitled Metody Vychislitel'noy Matematiki

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CHIKALOV, A. M., KULAKOV, A. A., and RAKOVSKIY, YU. I., VESTNIK AKADEMII  
NAUK SSSR No 8, 1976 pp 97-106

[Computer Mathematics Methods] was written jointly by associates of the  
Computer Center, Siberian Department of the Academy of Sciences USSR,  
and the French Institute for Problems of Information Science and Automation.  
It was edited by Academician G. I. Marchuk and by Zh. L. Lions and published  
in Novosibirsk in 1975 by "Nauka" Publishing House.

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USSR

THE HEWLETT-PACKARD CALCULATOR FOR SCIENTIFIC AND COMMERCIAL COMPUTATIONS

Moscow ENERGETIK in Russian No 5, May 76 outside back cover

[Abstract] The back cover of a recent issue of the Soviet journal ENERGETIK  
[Power Engineer] consists of an ad for Hewlett-Packard pocket calculators.  
Photographs [not reproduced] and very brief descriptions of the following six  
calculators are given: HP-21, HP-45, HP-25, HP-65, HP-22, and HP-80. The  
address for the firm's representatives in the USSR is given as:

Kh'yulett-Pakkard,	[Hewlett-Packard
101000, Moskva,	101000, Moscow
Pokrovskiy bul'var, 4/17,	Pokrovskiy Boulevard, 4/17
kv. 12	Apt. 12
Telefon 294-20-24, teleks 7825	Telephone 294-20-24; telex 7825]

The ad concludes with the announcement that inquiries for prospectuses and  
catalogs should be directed to the following address: 103074, Moskva, pl.  
Nogina, 2/5. Otdel promyshlennykh katalogov Gosudarstvennoy publichnoy  
nauchno-tekhnicheskoy biblioteki SSSR [103074, Moscow, Nogina Square, 2/5.  
Department of Industrial Catalogs of the State Public Scientific-Technical  
Library of the USSR.].

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## C. Economic Control at National Level

USSR

PISAREVSKIY, GENNADIY, Novosti Press Agency

ASU'S AT ALL LEVELS

Riga SOVETSKAYA LATVIYA in Russian 10 Aug 76 p 2

[Text] The scientific-technical revolution is fundamentally changing the nature of human labor. It is increasingly becoming control work. This is possible above all because of introduction of the ASU, the automated control system, into production. ASU's help people control production processes, enterprises, and whole sectors of the economy and in the future they may be able to control the entire national economy. On 1 January 1976 our country had 2,742 ASU's in operation. This figure is to almost double in the Tenth Five-Year Plan.

At many enterprises automated systems for control of technological processes (ASUTP's) have already become distinct elements of production. They regulate the work of rolling mills, cement and blast furnaces, and other large aggregates, as well as entire plants which work in an automated mode.

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USSR

PISAREVSKIY, GENNADIY, SOVETSKAYA LATVIYA 10 Aug 76 p 2

There is a developing trend in the country today toward the creation of integrated enterprise control systems (ASUP's). They ordinarily have three levels:

1. The ASUTP (automated system for control of technological processes);
2. Coordination of the joint work of automated aggregates, production sections, and shops;
3. Management of the economic activity of the entire enterprise.

For example, a control system has been set up at the Sebyakovskiy Cement Plant (Volgogradskaya Oblast). It determines the optimal chemical composition of the raw material, operationally changes the order of production of various grades and types of cement, allocates railroad cars, and sorts orders considering customers' needs and the enterprise's plan. All this is done from a single control console. The ASUP has enabled the plant to produce an additional 400,000 tons of cement and greatly reduce the number of employees.

ASU's can be very different; each enterprise needs its own system. But with planned management of the entire national economy it becomes possible, as

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USSR

PISAREVSKIY, GENNADIY, SOVETSKAYA LATVIYA Aug 76 p 2

mathematicians might say, to reduce all the systems to a common denominator. This will be the Nationwide Automated System for the Collection and Processing of Information for Planning and Administration (called OGAS) which is being set up in the country. According to the requirements defined by the nationwide system, the interaction of all ASU's is insured by a uniform system of codes and program compatibility.

It has been calculated that  $10^{16}$  arithmetic operations a year must be performed to achieve optimal management of the national economy. All the workers in the administrative sphere together have a capability of 10,000 times less than that. If information were still collected and processed by old, pre-cybernetic methods, people would have no time to think. Of course, this did not happen: the command of the times brought the ASU to life.

Theory interprets information as a reduction in indeterminacy concerning expected events. ASU's make it possible to reduce indeterminacy to a minimum, to correct errors, and to make correct decisions, as they say, "on the run." The use of ASU's based on the latest computers is bringing about a real revolution not only in production technology but also in planning, record keeping, design and drawing work, and scientific research itself.

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USSR

PISAREVSKIY, GENNADIY, SOVETSKAYA LATVIYA Aug 76 p 2

The document "Basic Directions of Development of the USSR National Economy in the Tenth Five-Year Plan," which was worked out by the 25th CPSU Congress, envisions "insuring continued development and growth in the effectiveness of automated control systems and computing centers, steadily joining them into the single nationwide system for collection and processing of information for record keeping, planning, and management."

Intensive work is under way in the country today to set up such a system. Its initial base is the sectorial systems of all the ministries and departments and the functional state systems (for planning calculations, statistics, standards, processing information on prices, managing scientific-technical progress, and the like). The OGAS will be a system able to solve management problems on an optimal basis for the entire national economy of the USSR. No country with a market economy has or can have such a system. Attempts at state regulation of the economy and attempts at national economic planning in the capitalist countries do not produce the desired results. Therefore, all economic life continues to be regulated by spontaneous market forces, which distorts proportions.

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PISAREVSKIY, GENNADIY, SOVETSKAYA LATVIYA Aug 76 p 2

Thanks to planning, our country for decades now has developed its economy at a high rate without crises and drops in production; our economy has maintained full employment. Building the OGAS is one example of combining the scientific-technical revolution with the advantages of socialism.

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USSR

KABULOV, V., academician, director of the Institute of Cybernetics With Computer Center of the Uzbek SSR Academy of Sciences

#### RESULTS AND PROSPECTS OF THE REPUBLIC AUTOMATIC CONTROL SYSTEM

Moscow PRAVDA VOSTOKA in Russian 13 Aug 76 p 3

[Text] With the help of the [Uzbek] republic automatic management system (RASU) all questions in the planning and administration of the economy will be solved, starting from the enterprise and including the ministry and the Gosplan and Council of Ministers of the republic. The RASU permits complete utilization of the advantages and possibilities of the economics of developed socialism. We have no elements of competition, of course, and all enterprises will produce output by starting from the needs and economic character of production. In that case there will no longer be a need for hundreds of thousands of specialists now engaged in unproductive accounting work in planning sections and accounting departments. Electronic computers doing accounting work at the rate of 250,000 to 1.5 million operations per second will take on their functions.

Cyberneticists are often asked whether we will see RASU or if it is meant for future generations. Our answer is that its outlines have already been plotted.

USSR

KABULOV, V., PRAVDA VOSTOKA 13 Aug 76 p 3

In the ninth five-year plan period, the Institute of Cybernetics with Computer Center of the Uzbek SSR Academy of Sciences created the methodological principles of the RASU. The technical requirement of the RASU was prepared and--a year earlier--a preliminary draft. The first phase of an automated system of planning calculations (ASPR), which is solving over 150 tasks, is in operation. The question of creating a republic collective-use computer center (VTsKP) has been decided in the affirmative. Its construction is being started this year. The material base has been created.

In the ninth five-year plan, many organizations and enterprises of the republic received electronic computers. There are now 76 computer centers in the republic. SU [Automated Management Systems] sections have been created in most ministries and departments. Institutions have been organized which provide for scientific investigations, planning and design and installation work. Qualified personnel have been trained. About 10,000 persons are now working and learning in the area of cybernetics, ASU and computer technology in various organizations and VUZ's of the republic. The Ministry of Higher and Secondary Specialized Education has organized four facilities with a cybernetic profile and a technical school.

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USSR

KABULOV, V., PRAVDA VOSTOKA 13 Aug 76 p 3

Thus, the scientific and planning work on the creation of ASU designated for the ninth five-year-plan has been completed and the foundations have been prepared for the functioning of a statewide system of data collection and processing. The first stage of the RASU, intended to coordinate the plans of the Gosplan with the ministries and to output into the apparatus of the Uzbek SSR Council of Ministers, will start working in 1977. Experiments started by the Institute of Cybernetics and the Gosplan data and computer center jointly with the ministries and departments are giving encouraging results.

Of course, not all is going smoothly. We have not succeeded in achieving full loading of the computers. The efficiency of a number of systems is still low. The problem of communication channels has not been solved, and this hinders the unification of computer centers into a single system. Confusion slows down document turnover. Computer centers are feeling a shortage of equipment, magnetic disks and paper. The republic has no production base for the manufacture of non-standard equipment such as sensors, transformers and specialized machines.

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USSR

KABULOV, V., PRAVDA VOSTOKA 13 Aug 76 p 3

Territorial systems must be created in the very near future in the oblasts and cities of the republic in order to compile plans of socio-economic development and monitor their execution. The aid of these systems, very important problems in the coordination of branch and territorial principles of the planning and management of the national economy will be solved.

The fact is that some ministries now, in constructing new enterprises, do not take into account all the complexity of the social problems of inhabited points: population growth, the level of social amenities, labor traditions, the training of personnel--dozens of extremely varied questions. In a word, each city needs a complex plan of socio-economic development in which the interests of enterprises, branches and the population would be reflected.

Combination of the territorial and branch systems is also necessary for the solution of such an important problem as a careful attitude toward the use of natural resources and protection of the environment.

Taking this into account, the Institute of Cybernetics has opened up its own affiliates in Namanganskaya, Ferganskaya and Samarkandskaya oblasts, the  
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USSR

KABULOV, V. PRAVDA VOSTOKA 13 Aug 76 p 3

Karakalpak ASSR and in Angren. At the same time, the Gosplan and the Central Statistical Administration of the republic are creating a network of data and computer centers.

In the ninth five-year plan, ASU was introduced into agriculture in a weak fashion. Numerous intra-farm and branch models of optimal planning in cotton-growing were compiled but, unfortunately, that work remained on the level of experiments.

Much has been done by the Ministry of Land Reclamation and Water Resources. The republic's best automated system for the designing of water resource objects in operation at "Uzgiprovodkhopok" [expansion unknown]. A special design bureau for non-standard equipment has been organized and a production base has been created for its series production.

In the start-up stage is the Zarafshan system, which will monitor the water distribution in the basis of that river. Starting and adjusting work is being done and programs are being tested.

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USSR

KABULOV, V., PRAVDA VOSTOKA 13 Aug 76 p 3

The Ministry of Land Reclamation and Water Resources and the Institute of Cybernetics have now designated a plan for the organization of communication channels and linking the ASU of the Syr-Dar'ya basin with the system of the Ferganskaya valley. The goal is to control the distribution of water between the regions.

We are very concerned about the absence of feedback between agricultural systems and water resource systems. Without the coordination of reliable quotas and conditions of water expenditure on irrigation of the fields, the entire complex system of water transportation can prove to be ineffective.

In the tenth five-year plan, the special attention will be given to the control of technological processes. However, at such very large enterprises producing fertilizers as those at Navon, Chirchik and Almalyk they have not yet started to create automated systems for the control of technological processes. Nor are they being created at enterprises of the food, meat and milk industries. Such sluggishness can be costly. However, to introduce automated systems for the control of technological processes it will be necessary to organize the production of non-standard equipment. According to preliminary  
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USSR

KABULOV, V., PRAVDA VOSTOKA 13 Aug 76 p 3

calculations, such equipment valued at 6 million rubles will be required for water resources alone. Therefore it is important to provide in advance for the development of this system at all the large enterprises.

The RASU is a collective creation and all the problems connected with its creation can be solved only by the joint efforts of scientific research and planning institutes, ministries and departments of the republic.

D. Extractive Industries, Fishing

USSR

UDC 658.5:681.3.008

STAROV, V. V. and BOBROVSKIY, G. S., ASUrybproyekt [expansion unknown]

ON THE PROBLEM OF CONSTRUCTING A DISPATCHER SERVICE IN THE COMPUTER CENTERS OF AUTOMATED MANAGEMENT SYSTEMS

Moscow RYBNOYE KHOZYAYSTVO in Russian No 8, 1976 pp 9- 90-91

[Abstract] Because of the large number of problems being solved at fishing industry computer centers, the question of rational use of their resources, especially during peak load periods, is becoming acute. For example, the computer center of the Institute "ASUrybproyekt" [expansion unknown] solves more than 40 individual problems for the first stage of the ASU [automated management system] for the fishing sector of industry which is being introduced by Minrybkhoz SSSR [Ministry of the Fishing Industry USSR]. During peak days at this institute's computer center, such resources as the Minsk-22 and Minsk-32 are completely loaded.

The dispatcher service of the system which controls the functioning of an ASU is responsible for organizing the servicing of requests for the use of computer resources. Its goal is to allot the limited resources of the  
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USSR

STAROV, V. V., and BOBROVSKIY, G. S., RYBNOYE KHOZYAYSTVO No 8, 1976 pp 9-90-91

computer center with maximum efficiency and in such a way that requests for the solution of specific problems are satisfied within specified periods of time. After discussing in some detail the purposes and organization of dispatcher services, the authors conclude that the search for problem solutions must be organized heuristically and present a diagram which illustrates the automation of a dispatcher service.



BRZENSKA, WINFRIED

CREATION OF AN "AUTOMATED SYSTEM OF CONTROL FOR INDUSTRY" IN THE MINISTRY OF THE MINING INDUSTRY AND METALLURGY IN THE GERMAN DEMOCRATIC REPUBLIC

UBER DEN AUFBAU EINES "AUTOMATISIERTEN SYSTEMS ZUR LEITUNG DES INDUSTRIEBEREICHES" IM MINISTERIUM ERZBERGBAU, METALLURGIE UND KALI [Creation of an "Automated System of Control for Industry" in the Ministry of the Mining Industry and Metallurgy in the German Democratic Republic] in Russian No 7, Vol 12, 1975 pp 9-15

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12, 1975 Abstract No 12G727 by Ye. M.]

[Text] The author shows that the reorganization of the economic affairs of the Ministry of the Mining Industry and Metallurgy of the GDR conducted since 1969 has imposed new problems on the industry administration. For this purpose the Central Institute of Metallurgy has developed an "automated system of control for the industry" similar to that system developed in the USSR. The basic problems of the system are the long-term and short-term planning of the organization of production at metallurgical enterprises for the purpose 1/2

EAST GERMANY

BRZENSKA, WINFRIED, UBER DEN AUFBAU EINES "AUTOMATISIERTEN SYSTEMS ZUR LEITUNG DES INDUSTRIEBEREICHES" IM MINISTERIUM ERZBERGBAU, METALLURGIE UND KALI No 7, Vol 12, 1975 pp 9-15

of optimizing the relationship between the amount of products produced by domestic industry and the amount imported, effective organization of the production of metallurgical products in the GDR by allowing for the influence of a large amount of imported raw material and fuel, separation of the metallurgical industry into zones of supply on the basis of financial considerations from the overall economic viewpoint. The apparatus base of the system is formed by computer centers in large enterprises which use computers such as the ROBOTRON-300, the Minsk-32, the YeS-1020 and the ROBOTRON-21. These computer centers by means of DFE-550 long-range information transmission devices are connected with the computer center of the Central Institute of Metallurgy. The author examines in detail the organization of the system, the organization of the information flow and several results of utilizing the system. Figures 4.

## E. Manufacturing and Processing Industries

USSR

OBUKHOV, V.

### SECOND-STAGE ASU OPERATING AT AUTOMOBILE PLANT

Moscow MOSKOVSKAYA PRAVDA in Russian ("The Computer Regulates the Conveyor")  
10 Jul 76 p 2

[Abstract] The Automobile Plant imeni the Leninist Komsomol was one of the first enterprises in Moscow to begin designing and adopting automated control systems [ASU]. The second stage of the ASU-Moskvich automated control system was approved by the State Interdepartmental Commission and successfully put into industrial operation here at the end of 1975.

According to Valentin Petrovich Kolommikov, general director of the "Moskvich" Association, the second stage is successfully solving the highly complex problem of synchronizing the operation of all of the auxiliary conveyers with the plant's main conveyer and maintaining a fixed rhythm. As bodies arrive from the paint shop, a conveyer-notification dispatcher uses the daily assembly graph developed by the computer and selects a set of documents which characterize the given vehicle body. Then with the aid of special technical devices, he sends messages about the automobile and its list of parts over the teletypes which have been installed in the plant's subassembly

1/2

USSR

OBUKHOV, V., MOSKOVSKAYA PRAVDA 10 Jul 76 p 2

shops and completion warehouses. The sequence of the messages constitutes the instructions to supply the proper components for the automobile. All this is responsible for achieving a stable production rhythm without which it is impossible to increase efficiency and quality or improve control.

The creation of an ASU necessitates the development of new economic mechanisms, new forms of accounting, different types of software, etc. There is also a social side to the question since a qualitative restructuring of human activity takes place when an ASU is adopted. Changes in the methods of receiving, transmitting, and processing of information lead to changes in decision-making and in the functional orientation of officials. Many people have to study control science and change the style of their work. Prominent specialists from the Automobile Plant imeni the Leninist Komsomol and associates of the Institute of Control Problems (Automation and Telemechanics), headed by I. M. Makarov, corresponding member of the USSR Academy of Sciences, have joined together to study and solve this whole complex of problems.

During the 10th five-year plan, special attention will be devoted to the problem of quality control. In addition, scientists from the Central Economic Mathematics Institute of the USSR Academy of Sciences have proposed developing for ASU-Moskvich mathematical models to solve the problems of predicting, planning, and operative control of the plants of the "Moskvich" Association.

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USSR

KOLODNIK, G., deputy director for Design and Technology of the ASUP Division, Minsk Engine Plant, and GORLANOVA, N., director of the Software Bureau of the ASUP Division

#### THE 'ASU-MOTOR-MINSK' AUTOMATED MANAGEMENT SYSTEM

Minsk SOVETSKAYA BELORUSSIYA in Russian ("On the Shoulders of the Computer")  
2 Jul 76 p 2

[Text] The collective of the Minsk Engine Plant is faced in the 10th Five-Year Plan with making a full transition to the manufacture of the new "D-240" engines which have been designed for "Belarus" MTZ-80/82 tractors. The adoption of advanced equipment, increasing its reliability and service life, and reducing the consumption of materials require of all the services at the enterprise a qualitatively new approach in solving daily problems. This explains the great attention which is being devoted here to improving control of the enterprise.

Engine builders in conjunction with the head development agency--the Central Scientific Research Institute for Organization and Control Equipment--are occupied with creating and introducing the "ASU-Motor-Minsk" automated management system.

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USSR

KOLODNIK, G., and GORLANOVA, N., SOVETSKAYA BELORUSSIYA 2 Jul 76 p 2

The ASUP [Automated Enterprise Management System] Division was set up in the process of creating the "ASU-Motor-Minsk" system at the plant. In conjunction with the plant's service departments it has done a great deal of work on analyzing data flows and document turnover and on determining the structure of problems with their input and output documentation. The plant's managers have given us their active support in this. For example, the chief engineer of the enterprise, I. Ya. Vorob'yev, has helped our service to become infused into the plant's collective and to surmount the psychological barrier which arose at the beginning.

Now the engine builders are preoccupied with the fact that within a short period the control of production and manufacturing processes will be shifted to the computer's shoulders, and they are concerned with obtaining the most savings. In conjunction with one of the planning, design, and processes institutes, an ASU TP [automated control system for technological processes] is being developed at the plant for conveyor-belt assembly of the "D-240" engine, as well as for testing engine assemblies.

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KOLODNIK, G., and GORLANOVA, N., SOVETSKAYA BELORUSSIYA 2 Jul 76 p 2

Of course, introduction of the system is not only a matter for the ASUP service and the institute but it is also the duty of the enterprise and of its managers in turn. A tireless campaign for the innovation is being waged in word and deed by Plant Director V. A. Rozhkov, his Assistant for Production, G. V. Nakaznyuk, Assistant Supervisor of the Engine Assembly and Testing Shop A. A. Grigorovich, and others. But far from all supervisors have turned to face the system. Not infrequently we encounter lack of faith in computer technology, which is slowing down the acceleration of scientific and technical progress and is reducing production efficiency.

Our troubles are not limited to this. It is a well-known fact that creating a system takes a long time. Meanwhile, production does not stand still. It changes and expands and new situations arise. As a result, complete solutions require radical revision when being introduced. The revision of one task entails changes in a number of other elements. Thus the system loses its current applicability. In order to avoid this, in our opinion, it is necessary to be guided by the following. The institute, when it begins to develop the system at an enterprise, right in the research and planning stage should make allowance for the plant's intentions, get a view of its future development,

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KOLODNIK, G., and GORLANOVA, N., SOVETSKAYA BELORUSSIYA 2 Jul 76 p 2

and strictly maintain the introduction schedule. This would make it possible to create a more flexible system step by step and one which is easy to introduce, as well as consistent and logical in its development.

Other problems also require a solution. For example, the absence of a classifier for industrial and agricultural products necessitates the development of a plant classifier for purchased components. All this is making compatibility with higher-level systems difficult. Not all consumer plants use standard documentational forms, which is also complicating the preparation of data and the development of a subsystem. The shortage of specialists is causing us serious concern, especially of mathematical programmers and systems engineers and designers.

USSR

UDC 681.1:62-50

KONSTANTINOV, V. P., TIKHONOV, A. A., FEDOTOV, O. P., Engrs

PECULIARITIES IN THE DESIGN OF ASU HARDWARE FOR SMALL-LOT-PRODUCTION TYPE ENTERPRISES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 6, 1976 pp 11-12

[Abstract] At present, alongside development of ASU's [automated control systems] for medium and large enterprises, the TsNIITU [Central Scientific Research Institute of Packing Materials and Packaging] in Minsk is developing ASU's for small enterprises, characterized by specific requirements due to their type of production in small lots, large assortment of products, continuous changes, long-term technological manufacturing cycle, attachment of equipment to specific technological operations, and frequent readjustment of equipment. All this complicates organization of the control of production and places peculiar requirements upon the structure of the hardware of ASU's, making more difficult the automatic introduction of data from the software. The article discusses in detail with use of mathematical formulas the requisites for the design of ASU hardware for small-lot-production type enterprises (number of workers less than 2000), viz.: the volume of  
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KONSTANTINOV, V. P., TIKHONOV, A. A., FEDOTOV, O. P., PRIBORY I SISTEMY UPRAVLENIYA No 6, 1976 pp 11-12

information, machine time, computer load factor, selection of computing equipment, organization of the Machine-Computing Station, and Machine-Computing Office in combination with the lease of machine-time in the Multiple-User Information Computer Center [MUICC]. As a leasee, the enterprise makes use of the necessary equipment and services of highly trained personnel of MUICC and is freed from the responsibility of taking care of and servicing this equipment. 1 Russian reference.

NOVOKHATNIY, A. A.

EXPERIENCE AND PROSPECTS FOR DEVELOPING A MODULAR COMPLEX FOR COMPUTER  
TECHNOLOGY RESOURCES ON THE BASE OF THE M-6000

Moscow AVTOMATIZ KHM PROIZ-V [Automated Chemical Production, Collection of  
Works] in Russian No 2, 1975 pp 29-36

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNIKA No 11, 1975 Abstract No 11B147]

[Text] The author examines the possibilities of using M-6000 and other  
types of processors which are a component part of the microelectronic  
version of the modular system of computer technology resources (ASVT-M)  
at enterprises of the chemical industry. Author's abstract.

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USSR

UDC 62-50-192.002.237:621.31

KULIKOV, N. YA., RASPUTNIS, A. M., DMITRIYEV, V. D., engineers

IMPROVEMENT IN NOISE STABILITY OF THE "KARAT" INFORMATION COMPUTING SYSTEM  
AT BELOYARSKAYA ATOMIC ELECTRIC POWER STATION

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 6, 1976 pp 10-11

[Abstract] The "Karat" Information and Computing System, which has been in operation in the second unit of the Beloyarskaya Atomic Electric Power Station from May 1969, fulfills the functions of measurement, signalization, printing and calculation, related to the work of the reactor and the thermomechanical equipment. In the initial period of operation, the reliability indices of the work of the system proved to be rather low. Malfunctions occurred especially frequently during starting and stopping of the unit. A careful investigation revealed the following interferences and measures were taken to correct them: a) noise induction in common zero conductor--the earthing of frames and units were checked and improved; b) induction due to presence of input capacitance between null points of units and their frame ( $C_{input}=3000$  pF) -- the tuning out was performed by means of selection in accordance with the length and amplitude of pulses; c) electromagnetic  
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KULIKOV, N. YA., RASPUTNIS, A. M., DMITRIYEV, V. D., PRIBORY I SISTEMY  
UPRAVLENIYA No 6, 1976 pp 10-11

induction in cables--time gating introduced and pulsed access changed to levelwise access; d) interferences caused by motor-generators due to commutator brush sparking--filters installed past motor-generators along the network. As a result of the realization of the above complex of measures the noise stability of the system was increased 10 to 12 times.  
2 figures showing types of interferences and noise suppression diagrams.  
1 Russian reference.

## G. Transportation System

USSR

### MODEL ASU'S FOR MARSHALLING STATIONS AND JUNCTIONS

Moscow ZHELEZNODOROZHNYI TRANSPORT in Russian No 7, 1976 pp 84-85

[Abstract] A joint meeting of Ministry of Railroads' scientific-technical council's commissions on computer technology and automation and on junctions and stations reviewed experience with the development and introduction of an automated control system (ASU) for the Orekhovo-Zuyevo marshalling station of the Moscow Railway and discussed questions pertaining to using this experience in development of standardized ASU's for marshalling stations and junctions.

To perform the functions of the ASU at the above station, a complex of two Dnepr-21 computers with systemwide external memory and a set of peripheral devices housed at the information center were introduced. The peripheral equipment included teletypes for station operators to communicate with the computers; devices to feed data from punched tape and output data to punched tape as well as an alphanumeric printer; equipment which insures signaling the work of computer units and operational semiautomatic switching of system memory on magnetic tape and switching peripheral units to work with either of the computers.

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ZHELEZNODOROZHNYI TRANSPORT No 7, 1976 pp 84-85

Software for the ASU was developed at the computing center of the Moscow Railway.

To supply the functioning of the ASU, informational message systems (models) and standards for the station's operating activity have been envisioned. The standards include tables for translating the codes of the uniform grid layout by destinations of the forming plan, for determining the technical specifications of a car by its number, norms for the weight and length of a train, data from the train traffic schedule, and so on.

All this enables workers at the station, without participation by specialists at the computing center, to feed raw data on current operations directly to the computer, particularly information on the arrival and re-formation of trains, corrections to the texts of telegrammed freight lists, lists of car numbers in formed trains, data on train departures, and the like, as well as requests for solutions to particular problems and receiving the results of calculations.

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ZHELEZNODOROZHNIY TRANSPORT No 7, 1976 pp 84-85

Based on experience with automating management decision-making at the Orekhovo-Zuyevo station, as well as at Leningrad-Marshalling-Moscow and Lyangasovo stations, the Central Scientific Research Institute of the Ministry of Railroads worked out the functional composition and hardware for a model ASU for a marshalling station, ratified the technical assignment (specifications), and, through the efforts of the planning-design technological bureau of the ASUZhT [Automated Control System for Rail Transport] and the division of computer technology at the institute, a contract design was prepared. Work on the design of the system is now under way. During the current year this system, based on YeS-1010 computers, will begin to be introduced at the following stations: Darnitsa on the Southwestern line, Perm' Marshalling (Sverdlovsk line), Gor'kiy-Marshalling (Gor'kiy), Kinel' (Kuybyshev), Kochetovka (Southeastern), and Yaroslavl' Main (Northern line). In all, 18 such systems are to be set up during the Tenth Five-Year Plan.

It was noted at the joint meeting of the scientific-technical council commissions, that work should be begun during the Tenth Five-Year Plan to establish computing centers at the major junctions of the grid. The Central Scientific Research Institute has prepared proposals for the functional

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ZHELEZNODOROZHNIY TRANSPORT No 7, 1976 pp 84-85

composition of the ASU's of the junctions and the hardware of junction computing centers and the technical assignment is being developed.

The commissions approved the results of scientific research, planning, and introduction of the ASU at the Orekhovo-Zuyevo station and recommended that the results obtained be used in designing the model ASU for a marshalling station based on third generation computers and in organization of junction computing centers.

USSR

#### YES-1022 INSTALLED AT RAILROAD CENTER

Moscow GUDOK in Russian ("A Computer Into Operation") 22 Sep 76 p 4

[Text] Irkutsk. A YeS-1022 electronic computer, developed by specialists of the CEMA-member countries, has been put into operation at the Vostochno-Sibirskaya [Railroad]. In comparison with existing machines, it possesses more powerful mathematical software and several times greater operating speed. Thanks to this, the time needed to elaborate problems for it is significantly lowered. The new computer has been included together with other electronic computers at the railroad center in the development of automated management system tasks.

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USSR

YATSENKO, V., director, Administration of Technical Operation of the Fleet and Ship-Repair Yards of MMF SSSR [USSR Ministry of the Maritime Fleet]

#### MARINE AUTOMATION, TODAY AND TOMORROW

Moscow VODNYI TRANSPORT in Russian 17 Apr 76 p 2

[Text] In his address at the 25th Party Congress, General Secretary of the Central Committee CPSU, Comrade L. I. Brezhnev, emphasized that at the present time "a drastic reduction in the proportion of manual labor and overall mechanization and automation of production are becoming the indispensable condition for economic growth." As far as marine transportation is concerned, this problem is being solved by increasing the proportion of automated vessels in the total number of the transportation fleet, by improving their technical maintenance, and by increasing efficiency characteristics.

The automation of ship-building processes is today one of the major trends for scientific and technical progress in marine transportation, promoting an increase in the labor productivity of ship-building crews and an increase in sailing safety.

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YATSENKO, V., VODNYY TRANSPORT 17 Apr 76 p 2

The intention at the present time is to conduct extensive tests and to develop hardware combinations for automating power plants on new ships so as to make the transition to actual operation without constant watch in the machinery department and at the central control room. On the tanker "Kuban" a trial run is already being made of the "Briz" all-inclusive automation system for solving navigation problems by means of computer.

More extensive use will be made of electronic and semiconductor engineering for creating control, monitoring, and ship-protection systems. In the long run, the most important and principally new guideline for the development of automation is the extensive use of combined computer information and control systems for ships, which will act as the engineering base for solving operating problems. Besides, ship computing complexes are making it possible to set up an operations link with the computing centers of shipping lines and of the ministry within the framework of the "Morflot" ASU [automated control system].

To provide for fail-safe and effective operation of automation hardware it is necessary to carry out repair and preventive measures in good time,  
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USSR

YATSENKO, V., VODNYY TRANSPORT 17 Apr 76 p 2

especially with a crew reduced in number. It is no accident that specialists involved in the servicing and repair of marine automatic systems have given presentations in a number of articles in the pages of the journal VODNYY TRANSPORT with suggestions for further improvement of this type of servicing.

To solve vital problems, TsNIIMF [Central Scientific Research Institute of the Maritime Fleet], in conjunction with the Black Sea and Baltic TsPKB [Central Planning and Design Bureau] have developed engineering management principles for creating production laboratories set up legally with the status of a production section with engineering maintenance and specialized shop (sections) facilities at ship-repair yards for repairing and setting up automation hardware. Engineering specifications have also been developed to provide for the use and repair of equipment and for making specialized test stands. Some of the first sections for the repair and setup of automation hardware made their appearance at the Baltic and Sovetskiy Dunayskiy shipping lines.

During the Ninth Five-Year Plan, 12 production sections with a BTO [engineering maintenance facility] for servicing and setting up automation hardware aboardship  
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YATSENKO, V., VODNYI TRANSPORT 17 Apr 76 p 2

while in operation have been created in shipping lines and furnished with the necessary equipment and complemented with qualified crews; specialized sections for repairing automation hardware during the scheduled in-yard ship-repair period have been created at eight ship-repair yards.

At the present time, shipping lines have 44 brigades numbering 325 specialists in the engineering maintenance and repair of marine automation hardware and monitoring-and-measuring devices.

The schedule of measures for improving all-around on-land servicing of ships for 1976-1980 provides for increasing the number of brigades to as much as 63 by 1980, and the number of specialists to as much as 630.

As indicated by the operating experience of the Novorossiysk Maritime Fleet Shipping Line, in a single port it is necessary to have two specialized subdivisions for the repair and setup of automation hardware, as well as a laboratory at the BTO and a specialized section at the ship-repair yard. With this type of structure, each subdivision performs the work for which it is intended.

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YATSENKO, V., VODNYI TRANSPORT 17 Apr 76 p 2

When necessary during the repair of a ship specific types of work on automation hardware can be performed by representatives of the production laboratory. This type of cooperation is maximally effective, and laboratory specialists ought to participate in performing setup work during the in-yard repair of automation hardware.

Worthy of consideration at shipping lines is the question of having devices repaired by specialized on-shore organizations of other departments, as is done, for example, at the Far East Merchant Marine Shipping Line, which utilizes the services of specialists from Sibmontavtomatiki [Siberian Automatic Systems Repair].

One of the conditions for ensuring timely and high-quality repair, as well as the efficient use, of automation hardware is the presence of a sufficient assortment of interchangeable spare parts (SZCh) and of a barter-type financial arrangement. At the present time certain difficulties exist in this regard, especially with respect to devices and equipment of foreign manufacture. Rules and regulations for SZCh's and for a barter-type financial arrangement are also lacking. But work on creating official

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YATSENKO, V., VODNYI TRANSPORT 17 Apr 76 p 2

papers of this sort has already been begun. True, for the time being they concern only automation hardware manufactured by the enterprises of the USSR Ministry of Instrumentation, Automation Hardware, and Control Systems.

The preparation of qualified crews occupies a special place in solving the problem of the successful utilization of automated ships. In keeping with the resolutions of the board of MMF in 1965 a department of automatic systems was initiated at Odessa Marine Engineering Secondary School, and starting this year a new field of specialization, "Utilization of Automated Marine Systems," has been introduced at navigation high schools, which has been included by the Ministry of Secondary and Higher Special Education in the "List of Fields of Specialization of Special Higher Educational Institutions." It is possible to assert that at the present time the Ministry of the Merchant Marine has available highly qualified crews capable of ensuring competent utilization, repair and setup of automation hardware.

The makeup of production sections for the repair and setup of automation hardware includes both engineers and technicians and workers. In particular, at the Dunayskiy Shipping Line the production section for repairing automation hardware at the BTO includes senior engineers, engineers, and workers. The  
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YATSENKO, V., VODNYI TRANSPORT 17 Apr 76 p 2

position of setup engineer performing the function of a worker can not be introduced for the time being since this type of combination has not been provided for by the rules and regulations in effect.

To provide a unified engineering policy in the area of automating the merchant marine and utilizing and overhauling it successfully, head and facility organizations have been created in keeping with decree No 69 of MMF of 1972. According to this decree the functions of the head organization in carrying out and coordinating scientific-research and regulatory work in the area of automation have been placed on the shoulders of the TsNII [Central Scientific Research Institute] of the Merchant Marine, and the functions of the facility-based organizations on the Leningrad and Rostov Central Planning and Design Bureau.

The solution to the large quotas imposed by the 25th Congress of CPSU requires the single-minded and energetic work of the collectives of production laboratories and yard sections in maintaining marine automation hardware in workable condition.

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USSR

CHUPALOV, V., deputy chief of the Computer Center of VORP [Volga United River Steamship Line]

#### TWO URAL-140's CONTROL STEAMSHIP LINES

Moscow RECHNOY TRANSPORT in Russian ("Organization of Problem Solving by the ASU") No 8, Aug 76 pp 31-32

[Abstract] The Computer Center of VORP [Volga United River Steamship Line] directs the operation of the first stage of an ASU [automated management system] for three streamship lines -- Volga United, Kamskoye, and Moscow -- as well as the Gor'kiy port. The basis of the center's hardware facilities consists of two Ural-14D computers. During the navigation period they have a three-shift workload. Inasmuch as the Ural-14D does not have service programs for formation and correction of arrays, only batches of messages which have undergone both of these stages can be recorded in the working file on magnetic tape. This means additional expenditures of time for the input of data in which logic errors have not been detected. However, this is offset by in that it leads to minimum correcting of arrays in the case where the error is detected at the time the calculations are made. This is especially important given the lack of reserves for re-calculating output forms.

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USSR

UDC 681.2-52:681.3.06

LILOV, TSVYATKO, STANCHEV, VALTER and NAUMOV, FILIP

#### DATA COMPRESSION IN AUTOMATED SHIP SYSTEMS

KORABOSTROYENE, KORABOPLAVANE [Ship Building and Navigation] in Bulgarian, Vol 14, No 4, 1975 pp 24-25, 27, 36

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNICA No 11 1975 Abstract No 11A387 by V. Sh.]

[Text] The authors note that with the modern trend to uniting all functions of ship control in a single center, the capacity of the computer's operative memory does not suffice for storing all current values of all the control factors. To prevent equipping the ship with a more expensive computer it is necessary to decrease the volume of information arriving at it. For example, it is not necessary to introduce into the memory values of the parameters that are within allowable limits. The data compression device plays this role. A block diagram is given for the algorithm for processing data by compression. Its introduction permits installing inexpensive small computers on board ships. Figures 3.

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## YUGOSLAVIA

### COMPUTER IN THE SERVICE OF MARITIME TELECOMMUNICATIONS

Zagreb AUTOMATIKA in Serbo-Croatian No 3-4, 1975 p 165

[Text] In conjunction with the telex, the computer can considerably improve transmission of messages and communication between ships and maritime companies. The development of maritime industry today is linked with highly perfected ship equipment. The complexity of this equipment requires the need for immediate contact between the ship crew and the specialists on land in case of malfunction. Loss in time causes considerable financial losses.

The Maritex system consists of special telecommunication equipment connected to a PDP-11/20 minicomputer. The computer has a primary memory of 20K and two auxilliary memories on disc and magnetic tape. It is possible to make 12 simultaneous connections. All company messages are registered both on the disc and the tape. Based on certain input data, condition of transmissions, position of the vessel, and such, the computer selects the frequency, the number of the ship, and the receiving-sending station. Messages from the ship are also being registered in their entirety by the computer. If communication with the company cannot be immediately established the message is retained and calls are being repeated until communication is established. [Photo not reproduced.]

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USSR

SAIDOV, M.

#### AUTOMATED INQUIRY SYSTEM FOR PASSENGER PLANES BEING INSTALLED

Moscow MOSKOVSKAYA PRAVDA in Russian ("Informeks' Knows the Answer")  
5 Sep 76 p 3

[Text] The equipment for the "Informeks" automated reference system is being erected in the Main Agency for Aerial Communications.

The electronic "memory" will store information on all problems connected with the movement of passenger planes. At any given moment the computer will output the necessary information to the operators who service the telephone inquiry bureau of Aeroflot. The data will enter the computer via telegraph from all corners of the country. In addition, the system will take upon itself the distribution of incoming calls among the operators on duty. "Informeks" will service not only the Central Agency, but all the airports of the capital as well. It is planned to put the new system into operation at the end of the current year.

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USSR

UDC 62-50:007:57

LUTCHENKO, N. V., and NIKOGOSOV, S. V.

#### ON THE DEPENDENCE ON SEVERAL FACTORS OF THE LATENT PERIOD OF THE SENSOMOTOR REACTION OF THE DISPATCHER FOR AIRPORT TRAFFIC SERVICE

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology, Collection of Works] in Russian No 2, 1975 pp 13-17

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12, 1975 Abstract No 12G526]

[Text] The authors analyze the specifics of the activity of airport traffic service dispatchers. They determine the time for the latent and motor components of the reactions of dispatchers of different age groups for certain types of stimuli. They investigate the dynamics of measuring the latent period in the course of the working shift. Tables 3; references 2. Authors' abstract.

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USSR

UDC 007.5:629.7

BOBER, V. I.

METHODS OF OPTIMIZING THE STRUCTURE OF INFORMATION CENTERS FOR AIR TRAFFIC  
AUTOMATED CONTROL SYSTEMS

Riga VYCHISL TEKHN I MODELIR SLOZHN SISTEM V GRAZHD AVIATSII [Computer  
Technology and Modeling of Complex Systems in Civil Aviation, Collection  
of Works] in Russian 1975 pp 33-43

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 5, 1976 Abstract No 5G 695 by  
V. K. Pryanikova]

[Text] The author describes the statement of a problem on optimizing the  
structure of information centers and methods of solving the problem for air  
traffic automated control systems. A physical description and a mathematical  
model of this problem are given, plus approximate and precise algorithms for  
solving it by the method of random search with adaptation, by the heuristic  
method, by the method of "branch and bound," and by combined methods. He  
suggests using the law of "optimal stopping" of the solution and also intro-  
duces a series of limitations which narrow the rational region of allowable  
solutions, thus substantially reducing the time needed for solving the  
problem. The algorithms suggested were investigated on type ASVT M3000,  
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USSR

BOBER, V. I., VYCHISL TEKHN I MODELIR SLOZHN SISTEM V GRAZHD AVIATSII  
1975 pp 33-43

Minsk-22 and Minsk-32 computers for problems of automated control systems  
in civil aviation and demonstrated their high degree of effectiveness,  
especially when combined. The algorithms examined here may be used for  
solving similar problems also in other branches of the national economy  
(in maritime and railroad transportation, in the automated control of  
industrial enterprises widely dispersed throughout broad territories,  
etc.). Figure 1; references 12.

2/2

ZUBIK, V. B., and TUZHIKOV, M. I., engineers

EFFECTIVENESS OF THE APPLICATION OF NONSTANDARD DEVICES IN THE COMPLEX OF  
AUTOMATED CONTROL SYSTEM HARDWARE

Moscow MEKHAIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3 (87),  
May-Jun 76 pp 49-53 manuscript received 19 Aug 75

[Abstract] Experience in the design and introduction of automated control systems shows that the operational and technical capabilities of their hardware complexes can be expanded when series produced hardware is supplemented by nonstandard devices which have been developed by and for specific enterprises and subdivisions of industry but which do not as a rule meet GOST [State All-Union Standard] specifications (hence the term "nonstandard"). The use of such nonstandard devices helps ensure that collection of primary data is automated in accordance with the specific features of an enterprise or sector of industry, that requirements for registration and display of data are met more completely, that ergonomic requirements are fulfilled more completely, that the overall time needed for a complete cycle of information conversion in the automated control system is significantly reduced, etc.  
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USSR

ZUBIK, V. B., and TUZHIKOV, M. I., MEKHAIZATSIYA I AVTOMATIZATSIYA  
UPRAVLENIYA No 3 (87), May-Jun 76 pp 49-53

Experience in developing and introducing nonstandard devices in motor transport and in a number of enterprises of the motor transport industry is related and a method of estimating the cost and labor intensiveness of the nonstandard devices is described for each specific case. References  
2: both Russian.

## H. Construction

USSR

UDC 65.011.56

KARIMOV, A. K., engineer, Uzbek SSR Ministry of Construction; and MAKHSUDKHODZHAYEV, S. N., VLADYCHEK, S. G., and TEMPEL', G. F., engineers, Information and Computing Center of the Uzbek SSR Ministry of Construction

THE INFORMATION BASE IS THE FOUNDATION FOR DEVELOPING A MINISTRY ASU

Tashkent STROITEL'STVO I ARKHITEKTURA UZBEKISTANA in Russian No 6, Jun 76  
pp 3-5

[Abstract] The Uzbek republic Ministry of Construction is taking a number of steps to improve the planning and management of construction on the basis of electronic computing and office machinery. In the first year of the Tenth Five-Year Plan there will already be a significant bolstering of the technical equipment of the first phase of the ministry's automated management system (ASU), which was adopted for industrial use in 1974, through incorporation of third generation YeS-series computers and filling out existing sets of equipment. Expanding and deepening the set of problems handled by computers today requires the establishment of a uniform set of standards and uniform ASU software for all levels of management from construction sections to USSR agencies as well as reconciliation of standards, development of data structure and its time-volume characteristics, and so on.  
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USSR

KARIMOV, A. K., MAKHSUDKHODZHAYEV, S. N., VLADYCHEK, S. G., and TEMPEL', G. F., STROITEL'STVO I ARKHITEKTURA UZBEKISTANA No 6, Jun 76 pp 3-5

The data and reference arrays will be developed on the basis of the principles of the departmental system for classification and coding of technical and economic data (VS-KK-TEI) of the USSR Ministry of Construction. Advantages of the system are uniqueness in reflecting the difference (or unity) of objects and characteristics and the possibility of expanding the encoded nomenclature without disrupting the system of classification and coding adopted initially.

The composition of the reference array is the most complex in terms of structure and volume of information. Its basic elements will be standard initial production indices of labor inputs and wages, expenditure of building materials, and needs for construction machines and mechanisms as well as norms for the expenditure of materials in the manufacture of construction designs and parts. Moreover, it is advisable for the data bank to have a reference selection of estimated regional unified unit cost rate lists and price list references for materials.

Putting the information and computing center of the Uzbek SSR Ministry of Construction into operation on YeS-1022 third-generation computers provides  
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KARIMOV, A. K., MAKHSUDKHODZHAYEV, S. N., VLADYCHEK, S. G., and TEMPEL', G. F., STROITEL'STVO I ARKHITEKTURA UZBEKISTANA No 6, Jun 76 pp 3-5

fundamentally new opportunities for organizing the storage of standard reference data. Formerly, sequential access machine carriers (punched cards, punched tape, and magnetic tape) were used to store data. The appearance of direct access devices (magnetic discs and drums) and the use of disc operating systems (DOS's) permits a significant reduction in access time for data from external memory, which makes it possible to use mathematical economic methods extensively in the planning and management of construction work.

Special characteristics of the development of the Uzbek SSR Ministry of Construction's automated management system are the simultaneous use of second and third generation computers and the fact that it supports the operation of subsystems at the computing complexes of other ministries and departments (the ASU Samarkhandkhimstroy Trust system and the ASDU-DSK [automatic supervisor system -- home building combine] of the Bukhara DSK are operated on the basis of computers of the oblast statistical administrations).

The structural composition and programs of the data bank need to be planned today, with due regard for the fact that the data base will be used for solving problems on different classes of computers at the same time.

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USSR

KARIMOV, A. K., MAKHSUDKHODZHAYEV, S. N., VLADYCHEK, S. G., and TEMPEL', G. F., STROITEL'STVO I ARKHITEKTURA UZBEKISTANA No 6, Jun 76 pp 3-5

Rational distribution of subroutines and problems by types of computers is crucial here: this will make it possible to use the technical resources (speed, external and basic memory, and so on) of the computers more efficiently. It is also advisable to envision the possibility of breaking the problems down into elements to perform separate operations sequentially on different computers. For example, the operational and calendar planning system now functioning is essentially an information system and does not take advantage of the technical potential of its equipment or use mathematical economic methods. This is because certain algorithms of the optimization methods are iterative and involve large numbers computations; with the significant volumes of data being processed and the Minsk-32's lack of direct access units, computation time is increased beyond the acceptable point. The use of YeS computers will make it possible to solve optimization problems in operational, calendar, and future (medium range) planning.

It seems advisable to break the problems down into their constituent parts, with the input, monitoring, packaging, and data printing operations done

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KARIMOV, A. K., MAKHSUDKHODZHAYEV, S. N., VLADYCHEK, S. G., and TEMPEL',  
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on second generation computers while the optimization units are in the YeS machines. Such a breakdown, however, will require an operations systems which insures data and program compatibility between Minsk-32 computers and the YeS-1022 machines. The purpose of building such a system is economically obvious because one hour of work by the Minsk-32 costs one fourth of an hour of YeS-1022 time. Furthermore, experience has already been acquired (by the Institute of Cybernetics of the Academy of Sciences Uzbek SSR) in the republic with combining M-220 and BESM-6 machines.

Partial program compatibility between the YeS computer and the Minsk-32 can be achieved by using the KONVERTOR system, which makes it possible to record programs written in COBOL for the Minsk-32 into programs in COBOL-YeS. In addition, this system can be used to translate arrays of data in the Minsk-32 code into arrays in the YeS system code. In this way a succession between the YeS-1022 and the Minsk-32 will be achieved.

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USSR

DZHGAMADZE, O., director of Information-Computer Center, Ministry of  
Construction Georgian SSR, Candidate of Technical Sciences

#### MANAGEMENT OF CONSTRUCTION AT THE LEVEL OF THE LATEST TASKS

Tbilisi, ZARYA VOSTOKA in Russian 24 Aug 76 p 2

[Abstract] A discussion is presented concerning the possibilities for broader application of mathematical methods, automated systems and computers in the organization of an effective management system for capital construction in the republic. Even today, the Information Computer Center of the Construction Ministry, using two Minsk-22 computers and third generation computers of the Unified Series, through 18 teletype channels, is performing 30 pressing tasks ranging from current planning, collection and processing of information concerning the course of construction, operational management through calculations relating to supply of materials and equipment, accounting for labor and wages. Automated management systems for the utilization of reinforced concrete structures and for mechanization and transport equipment are to be introduced soon. It is pointed out that the world's most perfect computer cannot assure timely completion of construction projects if supplier plants and subcontract organizations do not actually perform the tasks called for in the plan generated by the computer in a competent and timely manner.

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## I. Supply System

USSR

PROSYANOV, V., Student of the Higher Party School Under the Central Committee of the Ukrainian Communist Party

### AUTOMATED MANAGEMENT SYSTEM FOR SPARE PARTS

Kiev PRAVDA UKRAINY in Russian ("The Computer Helps") 24 Aug 76 p 2

[Abstract] The "Zapchast'" [spare parts] automated management system has been in operation for four years at the Information and Computer Center of the Zaporog Oblast "Sel'khoztekhnika" Association. The task of the system is to determine the requirements of plan consumers of the Oblast for spare parts, to distribute funds for spare parts to consumers and account for the funds, to account for goods in transit and goods to be distributed and more, a total of ten different management functions. Of every 100 spare part supplier plants, 94 now operate with the Association completely through the computer. Cases of excessive ordering and shortages of spare parts have been drastically reduced. According to L. P. Semenova, deputy director of the information-computer center, the primary data processing stations use Iskra-2301 electronic billing-accounting machines and the center itself is equipped with a Minsk-32 computer. The center will obtain one more computer by the end of the next year.

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USSR

KOMAROV, A., deputy director of VNIETsistem [expansion unknown]

STANDARDIZATION OF DOCUMENTATION IN TRADE CONTROL SYSTEMS

Moscow SOVETSKAYA TORGOVLYA in Russian ("The Language' of Automation")  
29 Jun 76 p 3

[Abstract] In our sector of industry much work has been done on practically all levels to introduce computer technology and to create automated trade control systems (ASUT). The first stages of ASUT have been introduced in such large retail trading enterprises as the Moscow GUM [State Department Store], the Leningrad department store "Gostinyy Dvot," TsUM [Central Department Store] in Kiev and wholesale bases in Vil'nyus, Riga and Minsk. Computer centers have been created in the main administrations of trade of Moscow, Leningrad and Kiev and the administrations of trade of Bryanskaya, Volgogradskaya and Gor'kovskaya oblasts. Computer centers are being created in the republic universities and the first stage of an automated control system for the USSR Ministry of Trade has been introduced.

In the tenth five-year plan period much must be done both along the line of expansion of objects embraced by automated systems and in relation to the  
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KOMAROV, A., SOVETSKAYA TORGOVLYA 29 Jun 76 p 3

deepening and expansion of the tasks solved by automated control systems. That work is being done within the framework of a coordinated plan for the creation of a sector-wide automated trade control system (OASUT).

Already, ever since the first steps were taken in the use of computer technology to solve separate tasks of accounting and planning at the time of the creation of experimental ASU in industry and later in trade, it has become clear that the information used in traditional methods of control is not always suitable and adequate. Informational software for the ASUT is necessary. The main thing here is standardization of the documentary base and coding of the information that is used. In 1973-1974 our institute VNIETsistem [expansion unknown] prepared special standards defining the purpose and composition of standardized documentation for trade used in ASUT and also the requirements for the system and the forms of documents entering it. The USSR State Committee for Standards is doing much work at present in the branch on the creation of highly standardized documents. The standardized documentation system for trade prepared by our institute and the UkrNKITOP [Ukrainian Scientific Research Institute of Trade and Public Eating Facilities] and now being introduced at basic enterprises is designed to provide software to primary ASUT subsystems: study of the  
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KOMAROV, A., SOVETSKAYA TORGOVLYA 29 Jun 76 p 3

competition and demand, planning of trade turnover, control of the supply of commodities and management accounting. In planning a standardized documentation system for trade not only were the requirements for convenience of machine processing of documents taken into consideration but an analysis also was made to determine the recurrence of information in different forms and the duplication of indicators. This made it possible to reduce the number of documents. Thus, for example, for subsystems for planning trade turnover and control of commodity supply a total of 22 standardized documents was prepared in place of 175. The use of such forms will make it possible to reduce labor expenditures in filling them out by about 40%. If the number of accounting and planning workers is taken into account, the saving resulting from introduction of the standardized documentation system for trade will amount to hundreds of thousands of rubles. In addition, the preparation of documents will be substantially curtailed, the possibility of the appearance of errors will be reduced and data retrieval will be facilitated. The standardization of trade documents is a part of the work in creating a statewide automated system. Interdepartmental documents, including those accompanying commodities, will be tested in 1976 on the basic objects and it is planned to introduce them everywhere next year. A second

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KOMAROV, A., SOVETSKAYA TORGOVLYA 29 Jun 76 p 3

important problem is the classification and coding of data. The coding systems used are in essence the "language" of ASU and to a considerable degree determine the development of computer programs. And if that "language" is different in each computer center that will not only make the exchange of information difficult but will also in general exclude the possibility of standardization of programs.

Several dozens of all-union data classifiers are being developed--of industrial and agricultural production, of enterprises and organizations, of occupations, of duties of manual and clerical workers and the tariff rates of control documentation.

The main objects of control of ASU in the trade sector of industry are consumer goods, and so their classification and coding are an integral and very important part of the task of working out the providing of information for an ASUT of any level. In that case all that information must "tie in with" similar materials of other branches. And there is still much to be done there, to bring them into agreement. Unfortunately, the trade sector of industry can use the all-union classifier of production, to be issued and introduced in 1976, only as an intermediate language for information exchange

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KOMAROV, A., SOVETSKAYA TORGOVLYA 29 Jun 76 p 3

with industrial sectors and planning organs. This is why its own sector-wide classifier of commodities must be developed, and our institute and the All-Union "Soyuztorgsistema" [expansion unknown] Association are now engaged in such development. The work will be coordinated with Tsentrosoyuz [USSR Central Union of Consumer Societies]. We have examined only two of the most important aspects of the creation of the informational software for ASU in our sector of industry and, naturally, the group of unsolved questions is not exhausted by this. The creation of a normative base and the working out of the principles of organization of information and reference systems are also inherent conditions of the effective functioning of ASUT. Investigations are also being conducted in those directions.

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K. Agriculture, Water Management,  
Land Reclamation, Silviculture

USSR

Author not given

THE HARVEST IS CONTROLLED BY COMPUTERS

Kiev RABOCHAYA GAZETA in Russian 21 Jul 76 p 1

[Text] The scientists of the Northern Scientific Research Institute of Hydraulic Engineering and Land Reclamation have instructed computers to cultivate the harvest in accordance with a previously planned program. Experimental plots in Arkhangel'skaya, Bryanskaya, Kalininskaya, Kostromskaya and Leningradskaya oblasts are connected by teletype with the Information and Computing Center of the institute, which makes it possible to receive the recommendations of scientists and to transmit the data concerning the state of sowings in a timely manner. By means of electronic calculators, mixtures of mineral fertilizers necessary for the nutrition of plants are being compounded. On controlled plots equipped with a system of irrigation, the scientists, together with field crop growers and meteorologists, have planned to obtain crops of grain, potatoes, cabbage, and annual grasses, three times as high as the usual ones. According to their estimates, the growing periods of these crops will also be shortened.

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RABOCHAYA GAZETA 21 Jul 76 p 1

The first experiments carried by the Leningrad scientists took place last year on the irrigated soils of Luzhskiy [Luga] Rayon; they made it possible to obtain up to 11,000 feed units of green plant material and up to 500 metric centners of potatoes per hectare. This surpasses by four times the average crop in Leningradskaya Oblast.

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USSR

EYSNER, F., assistant director of the NII [Scientific Research Institute] for Livestock Breeding of the Forest-Steppe and Woodlands of the Ukraine, professor, corresponding member of VASKHNIL [All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin]

#### COMPUTERS IN ANIMAL HUSBANDRY

Moscow SEL'SKAYA ZHIZN' in Russian 29 Aug 76 p 2

[Text] Scientific and technical progress, which is rapidly enveloping animal husbandry disciplines, is requiring the analysis and unification of more and more extensive data. Thus, whereas in past years in compiling rations for cattle basically only the animals' requirement for the total energy content of the feed (in feed units) and their protein requirement were taken into account, now it is necessary to attend to scores of indicators characterizing the nutritional value of the feed, including various forms of carbon (cellulose, starch, and sugars), the amino acid composition and fractions of the protein, and a number of vitamins and minerals. It is already practically impossible to compile with pencil and paper the optimum rations from a wide set of feeds and special additives furnished by industry. But with the assistance of computer technology it is not difficult to model scores of variants of different solutions and to choose from them those which are best both

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EYSNER, F., SEL'SKAYA ZHIZN' 29 Aug 76 p 2

with respect to their physiological effect on the animal's body and with respect to economic indicators.

No less important is the use of computer technology in breeding. Here also the number of indicators to be taken into account in selecting animals has grown considerably. A milk cow, for example, was previously evaluated chiefly according to its milk yield and the content of fat in its milk. Now to this have been added qualitative evaluations such as its suitability for mechanical milking, the albumin content in its milk, its resistance to mastitis, and a lot more. But it has long ago been proven that the more traits which are taken into account in selection the more difficult it is to achieve an improvement in each of them.

Furthermore, every year the number of animals on farms increases. Practice has shown that a breeder working with a flock of longhorn cattle can retain in his memory the origin, productivity indicators, and distinctive features of 300 to 350 animals. But if there are two to three times more of them, then the electronic memory of a computer must come to his aid.

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EYSNER, F., SEL'SKAYA ZHIZN' 29 Aug 76 p 2

Present systems recordkeeping for breeding have taken form over thirty years of creating kolkhoz and sovkhos farms with a number of 100 to 120 head of cows and 30 to 50 sows. Now on large farms there are a thousand and more cows and pigbreeding complexes number several hundreds of sows. Furthermore, if it is taken into account that according to current rules only the name, number, date of birth, and breed of each animal must be entered by the livestock breeder every year on various forms seven to eight times, then the total number of annual entries is almost in the seven-digit range. In addition to this there is the huge volume of numerical processing of these entries. Thus, in compiling a summary account for the classification of longhorn cattle, the livestock breeder who uses a clerk wastes as much as one and a half months. This work can be done in two to three days using a computer.

A number of institutions are developing and systems for processing data from breeding record by means of the computer introducing them into the areas which they serve. This type of processing has found the most extensive practical application on farms in Leningradskaya Oblast, Latvia, and Lithuania. The Institute for Livestock Breeding of the Forest-Steppe and Woodlands Ukrainian SSR has arranged for processing of classifying data on the kolkhozes of

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EYSNER, F., SEL'SKAYA ZHIZN' 29 Aug 76 p 2

seven rayons in Khar'kovskaya Oblast. As a result, the expenditure of labor for this work has been reduced by a factor of 10 to 12. Similar programs have been put together by the Institute of Farming and Livestock Breeding of the Western Rayons of the Ukraine.

During the years of the last five-year plan, agricultural-science and educational institutions received a great deal of computer hardware. Thus in Khar'kovskaya Oblast the Ukrainian Institute of Poultry Farming and the Agricultural Institute imeni Dokuchayev have "Minsk-32" computers, and the Institute of Livestock Breeding of the Ukrainian SSR Forest-Steppe and Woodlands and the Khar'kov Livestock Veterinary Institute have "Nairi"-type computers. Besides, a network of rayon computing stations is operating in the oblast, as well as an oblast computing system which is under the statistics administration.

Consequently, there is a undoubted demand for the use of computer technology in livestock breeding, and the materials base for satisfying this demand is available. But extensive practical application of the computer in breeding has still not been achieved.

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EYSNER, F., SEL'SKAYA ZHIZN' 29 Aug 76 p 2

What is in the way?

First and foremost there is an obstacle in the absence of a system for utilizing computer technology which is comprehensive and has been approved and recommended by the USSR Ministry of Agriculture. Each scientific institution is developing its own programs for processing materials, proceeding from its own interests and the type of computer it has received. These programs have in no way been certified or approved and are familiar only within the limits of the area in which the institute in question is operating directly.

A Main Computing Center has been set up at the USSR Ministry of Agriculture; evaluation of the programs for computer utilization which have been developed and recommendation of the best of them for wide use should become part of its job immediately. It must be assumed that during the period of its existence this center has solved problems of some sort. But no suggestions have come from it for breeding work in animal husbandry. And it has been under no pressure to cope with this task.

In our opinion it is advisable to create at the All-Union Academy of Agricultural Sciences imeni V. I. Lenin a special council on the use of computer  
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EYSNER, F., SEL'SKAYA ZHIZN' 29 Aug 76 p 2

technology in agriculture with a section for livestock breeding. It would be able to be given the task of having scientific institutions meet schedules for compiling programs for the most urgent problems in conformity with the schedule mentioned earlier. And in conjunction with the computing center it should be responsible for the accumulation and approval of the programs which are compiled and also for presenting them to the scientific and technical council of the USSR Ministry of Agriculture for approval and recommendation for implementation.

Because of the seasonal nature of the arrival of materials and the specific nature of the work, computing centers accept data on the breeding business for processing reluctantly. It is obvious that it would be useful to create specialized area computing centers at institutes, state breeding stations, or state breeding associations. A center of this sort would be able to serve farms in several oblasts. But for this it is necessary to work out a clear-cut system for transmitting the necessary data utilizing modern communications facilities. In the future the functions of these centers will be expanded and the computer will be able to be used not only for keeping records on the breeding business but also for solving a number of other problems. Among  
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EYSNER, F., SEL'SKAYA ZHIZN' 29 Aug 76 p 2

these are evaluation of sires according to the quality of their progeny, as well as the development of schedules for breeding based on mathematical-genetic simulation of the selection process on the farm, rayon, and oblast scale and according to entire breeds. The concentration of all data on the quality of animals at centers opens up entirely new possibilities for scheduling of this sort.

The wide use of electronics and computer technology requires that the system of livestock breeding accounting be put in order, beginning with the conditions which have become established at large industrial-type livestock breeding farms.

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BULGARIA

KRAYNOV, L.

CYBERNETIC CONTROL OF AGROCHEMICAL OPERATIONS IN BULGARIA

Moscow PRAVDA in Russian ("Cybernetics---for the Harvest") 17 Aug 76 p 5

[Text] Sofia, 16 (Pravda's Own Correspondent). At the Institute of Soil Science and Programming of Crops imeni Pushkarev a new system of agrochemical service is being worked out. It will be operated by the Institute's electronic computer center which will be connected to the electronic computer centers of agro-industrial complexes and neighboring cities. With their help the Institute will obtain and process the necessary information. In drawing up recommendations concerning fertilizers, 25 factors which directly or indirectly affect the fertility of soil are being taken into account.

After the system will be finally put into operation, the drawing up of recommendations on fertilizers for a single agro-industrial complex will require only 7-8 minutes and for the entire district 2 to 3 hours. Whereas previously such recommendations were drawn up periodically every four-five years, at present they will be given every year. The system envisions an operative control of the agrochemical service that will take into account any changes in the factors which affect the fertility of soil.

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BULGARIA

KRAYNOV, L., PRAVDA 17 Aug 76 p 5

By the end of the present year, the new cybernetic system will encompass 135 agro-industrial complexes which have at their disposal 80 percent of the cultivated soil in the country.

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III. SOCIOCULTURAL AND PSYCHOLOGICAL PROBLEMS  
A. Philosophical and Legal Problems

USSR

YAROMENOK, A.

ROLE OF CYBERNETICS IN DEVELOPMENT OF NATIONAL ECONOMY LAUDED

Kiev POD ZNAMENEM LENINIZMA in Russian ("The Logic of Cybernetics") No 11,  
Jun 76 pp 59-60

[Abstract] The term cybernetics today means the art of control. It is the science of optimal control of complex dynamic systems and the achievement of goals imposed with the least expenditures of labor, time, materials, energy and information. The goals of the Soviet Union for the years 1976-1980 will include as an extremely important phase of development research in computer technology. The current rate of development is very high and will continue to increase. Cybernetics is being used in long-range planning on all levels of the national economy, in control of production, transport, automated design, space flight, instrument building, art and culture, and public health. It must be remembered that while automation increases the physical capabilities of man, cybernetics expands his intellectual possibilities and makes his work more creative.

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USSR

MATVEYEV, V., Political Observer of Izvestiy, Washington-Moscow

COMPUTERS AND PEOPLE IN THE UNITED STATES

Moscow IZVESTIYA in Russian ("Computers and People") 16 Sep 76 p 4

[Abstract] Following a tour of the United States, the author presents his general impressions. He sees plastic and glass rooms full of the most modern and competent computers whirring away busily solving the problems of business, but totally unable to solve such social problems as poverty and unemployment; people seeking to escape from the rat race and factory grind in science fiction disaster movies (such as "Future World" and "Logan's Run") and new, fundamentalist religions. However, the author is an optimist concerning the US: after reading "Zen and the Art of Motorcycle Maintenance" and listening to Americans discussing the need to take a more realistic view of the Soviet Union, and to attend to internal priorities rather than continually increasing the defense budget, he feels that time, the best healer, will improve the situation in the USA and relationships between the two countries.

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## B. Urban Systems and Communal Services

USSR

ANDRYUKHOV, YU., engineer

### MINI-COMPUTERS IN RETAIL SHOPS

Moscow GORODSKOYE KHOZYAYSTVO MOSKVY in Russian No 6, 1976 p 38

[Text] In connection with the increase of listed products and expanded turnover of goods, it becomes increasingly difficult to control commercial processes. That is why in the spheres of servicing the population electronic computers are finding ever-wider use. Thus, at the international exhibition of "Interorgtekhnik-75," Bulgarian specialists have demonstrated a system for the control of commercial processes in retail stores based on mini-computers and peripheral devices. The system includes: an electronic computer with storage capacity of 8,000 data units which may be expanded to 32,000, a device for the readout of information from reels, punched tapes, punched cards and cash-register videoterminal apparatuses.

Among the peripheral devices, special attention should be given to the cash-register apparatus which permits the worker who operates it to obtain the maximum of information about 60 products handled in the department or section. The apparatus has nine registers, automatic index of the remainder, and a 1/2

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ANDRYUKHOV, YU., GORODSKOYE KHOZYAYSTVO MOSKVY No 6, 1976 p 38

panel for visual observation of the operations being carried out, and a simplified keyboard.

The apparatus permits one to total the checks automatically and to record the data on operations on a magnetic tape or to transmit them over communications channels to the computer. When the power supply is out of action, the data are preserved in the storage device. The system may work in two modes: in the first, it records and keep tracks of 1,200 listed goods and be connected to up to 32 cash-register videoterminals at maximum distance of 1500 m. The transmission of data from cash-register apparatuses to the computer is effected at a speed of 220 data units per second. In the second case, the system makes it possible to perform operations for 3800 listed goods and to service up to 128 cash registers. In this case the readout of data is effected after delivery of reels to the computing center. The system collects and automatically processes data on goods handled in the retail store, their price and general value, kind, dimension, growth and date of handling. It permits one to determine the load of individual sections and to obtain information on the availability of this or that product in the storehouses, to determine minimum necessary reserves for each variety, etc.

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USSR

ZAV'YALOV, A., non-staff Correspondent of Sovetskaya Litva

#### COMPUTERIZATION OF FOOD INDUSTRY IN LITHUANIAN SSR

Vil'nyus SOVETSKAYA LITVA in Russian ("The Computer Controls") 8 Aug 76 p 4

[Text] On Monday, the first stage of the automated production control system (ASU) for the Lithuanian SSR Ministry of the Food Industry became operational.

The State Commission has approved for operation, with the evaluation "good," the first stage of a production ASU for the Lithuanian SSR Ministry of the Food Industry. It has been designed and introduced by the engineers and designers of the Planning and Design Office of the Ministry in cooperation with scientists. At present, the solution of complex problems in accountancy, technical-economical planning, and operative control have been taken over by electronic computer YeS-1020. The computer performs 200,000 operations per second.

"The introduction of an automatic control system for a sector of industry," says Deputy Chief of the Planning and Design Office of the Ministry, V. Rumsha, "has radically changed the processes of planning, calculation and 1/2

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ZAV'YALOV, A., SOVETSKAYA LITVA 8 Aug 76 p 4

control, and made peoples' work easier. In the future, the ASU will be solving two more problems, viz., material-technical supply and a complex quality control system for production based on standardization."

A great deal of labor on the introduction of the first stage of the ASU was spent by the following designers: R. Sadauskayte, V. Samulenayte, programmer V. Straupite, and engineer R. Meylyulis.

The economists have estimated that the annual economic effect from the introduction of the ASU will be not less than 300,000 rubles.

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USSR

CHERNYKH, V., Moscow

#### COMPUTERS IN THE FIRE DEPARTMENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Aug 76 p 4

[Excerpts] Today the computer has assumed the complex functions of a central dispatcher for the Moscow Fire Department.

Here is the operations building of the Central Automated System for Communications and Control of Firefighting Equipment (TsASS and UPT). In the spacious, well-lit room were rows of control consoles. The movements of the operators are precise, calm, and confident. Just like they did before, the controllers write down the addresses of fires. But this data is now necessary only for entry into the computer.

The conversation with the machine is conducted in symbolic language, which simplifies communication with the electronic brain. Controller N. Milyukov tapped out the machine code on the teletype and indicated the details of the fire and the address of the site (location of the fire). The computer reacts to the signal in a matter of seconds. Numbers indicating the result of the processed information light up on a large display and then "fly" along through warning-telegraph communication channels. The teletyped message is an order

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CHERNYKH, V., SOTSIALISTICHESKAYA INDUSTRIYA 18 Aug 76 p 4

for the on-duty guard at a firefighting unit. And as soon as the computer has produced it, automatic transmitters inform the center of the message. And if there is a delay at the vehicle station of only one second (readiness time is 45 seconds), the computer will know about it and the following letters light up on the display: "ATs" for tank engine, "AN" for pumping engine, and "L2" for mechanical ladder, that is, the names of the "guilty" services. But as a rule there are no delays.

The automatic devices have an exceptional ability to "unravel" bottlenecks. The senior controller has a unique record book before his eyes, a lit-up map of fire hydrants and sites at which a fire has broken out. The computer keeps a chronological record of all the information. It is possible to reconstruct the pattern of the control service for a day, week, or month.

"Once a certain citizen," recalls Assistant Engineer L. Chentonov, "made a complaint to the firefighting administration. It amounted to the fact that the engine arrived at the hydrant one half hour after the call. The specialists switched on the electronic recording and the citizen had to

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CHERNYKH, V., SOTSIALISTICHESKAYA INDUSTRIYA 18 Aug 76 p 4

offer her apologies. It seems that in her first call from excitement she named the address of the apartment which she had recently left. And the exact data was sent to the control point for her neighbor. Thus, electronics vindicated the firefighters."

And what if, however, the address was erroneous and there is no such building? The computer will request, "make address more precise."

For the time being the Moscow Automated Communication System Center is the only one in the country. But development work is being carried out even now and electronic systems are being created in Gor'kiy, Tallin, and Kiev.

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USSR

PERKHOV, A., Moscow

Moscow PRAVDA in Russian ("The Computer 'Sews' Garments") 12 Jul 76 p 2

[Excerpt] The Soviet Union's first automated control system designed to serve the concerns of everyday life began to operate in the enterprises of the Moscow Administration for Sewing and Repair of Garments according to individual orders from the people.

"Our electronic computer," says Director of the Computer Center, I. Yuzvishin, "with the aid of special programs makes estimates for technical-economical planning, carries out bookkeeping accounts, solves problems of operational control, and helps to analyze the level of the quality of services and labor outlays. Normative-reference information is also fed into its memory, and in using it the computer faultlessly determines the accuracy of the atelier's accounts with a customer..."

In the machine room of the Computer Center, a "Minsk-32" is being readied for carrying out the task. The operator, having run his fingers over the keyboard of the typewriter, passed the task to the computer. It answers by the blinking of lamps on the console, and within a few seconds the printing device

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PERKHOV, A., PRAVDA 12 Jul 76 p 2

produced a chart with an analysis of the time of fulfillment of services. If the order was delayed in the atelier, the cause of it is given. Here too are noted the number of the cutter and the production team...By reading the chart, the supervisors of the factory and atelier also learn the actual culprits and the causes which produced the delay.

The computer takes into account the availability of fabrics and accessories in the storehouses and prepares listings of manufactured articles. By processing information incoming into its memory, the computer gives data about which fabrics are purchased by customers on credit and which they bring with them. Now it is easier to forecast changes in the demand for services.

As we see, the automatic control system encompasses the most important aspects of production. To have a picture of the situation in each atelier or in the factory as a whole, only a few minutes are needed.

"As a result," says the Chief of the Administration, A. Terent'yeva, "we can estimate in a more timely fashion the changes taking place in the enterprise. At present we have available analyses of the amount of work in the enterprise, monitoring of time due, quality of fulfillment of orders and

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PERKHOV, A., PRAVDA 12 Jul 76 p 2

the quality of services to the population. The planning of service is carried out on a strictly scientific basis."

The work of specialists is undergoing a change. They now have more time for a thorough analysis of the course of the fulfillment of plans, and for determination of the prospects of production. At present almost 200 persons have been freed from the tiresome sorting out of receipts and listings, and when the automatic control system will cover all enterprises this number will exceed 1,000. The annual economic effect which is provided by the services of the Computing Center amounts to 600,000 rubles.

We cannot help noting that the use of the computer has permitted the unification and simplification of documentation.

"Recently," said the receptionist of one of the ateliers of the 6th Factory, L. Chigryayeva, "in our factory a new form of receipt has been introduced, which replaced four similar documents. The time of registering of each order was reduced by four minutes. Formerly, near my desk there was a long waiting line. At present, as you see, it is free. Thus, it is possible to pay more attention to customers. The enterprise serves approximately

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PERKHOV, A., PRAVDA 12 Jul 76 p 2

6 million Moscovites a year. This means that the workers of the service, by perfecting documentation, have saved more than 300,000 hours for the population of Moscow. There is also a considerable savings of paper--in the past year the Administration received 23 million receipts; now their numbers will considerably decrease."

But the main point is that the quality of services improved, as well as the quality of the fulfillment of orders. During the six months of the current year, the number of complaints decreased 2.5 times as compared with the same period in 1975.

The automatic control system brought about many pleasant changes to sewing workers. However, the effect of its introduction would be greater if all the operations were automated. At present, receipts and other documents are delivered from the majority of factories to the Computing Center via motor vehicles. It is necessary to transmit the content over the communications channels. However, such lines are as yet few. The Moscow City Executive Committee apparently is capable of solving this problem.

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PERKHOV, A., PRAVDA 12 Jul 76 p 2

It was decided to impart a collective character to the Computing Center of Sewing Workers. It will be used likewise by administrations of essential services to the population and by municipal management of the city. All Moscovites will benefit from this.

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USSR

UDC 62-50.007

CHACHKO, A. G., Candidate of Technical Sciences, and DOLGONOSOV, N. S.,  
engineer

THE TRAINING OF ASU OPERATORS IN THE ANALYSIS OF OPERATIONAL SITUATIONS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 6, 1976 pp 4-6

[Abstract] The analysis of operational situations connected with disturbances in technological regimes is one of the important aspects of the activity of ASU [automated control system] operators. The goal of such analysis is to ascertain the actual cause of the disturbance of the technological regime, which makes it possible to take steps to eliminate it by localizing the hotbed of the disturbance and introducing a reserve control. The analysis should be based upon rigorously directed productive thinking. The operator must be capable of devising a whole system of hypotheses, selecting from this system the assumptions which are probable in the given situation, making use of the pertinent information and performing diagnostic operations, striving thereby to find out the real cause of deviations in the regime.

Up to now it was erroneously considered that the know-how of analyzing operational situations should be acquired by operators in the process of  
1/4

USSR

CHACHKO, A. G., PRIBORY I SISTEMY UPRAVLENIYA No 6, 1976 pp 4-6

the training at working positions. This was unsystematic and could bring about impairment of technological equipment, and the economy and safety of the process. The recent trend is to teach operators to think operatively prior to their training on the actual equipment; during the training period operators should consolidate their previously acquired knowledge and learn to rapidly construct hypotheses, analyze situations and make appropriate decisions. For better achievement of this goal, an optimum method should be worked out for schematic representation of operational situations. In this respect the most promising are the so-called "situation evaluation trees" (SET) worked out by the Kiev Institute of Automation with the participation of the Southern Branch of the State Trust for the Organization and Rationalization of Regional Electric Power Plants and Networks (ORGRES). The SET is visualized as a hierarchically branching structure that reflects directional connections between technological events which may bring about a given situation. To achieve maximum effectiveness, the construction of SET should fulfill two requirements: the completeness of information and the ease of assimilation. Therefore SET should contain an exhaustive list  
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USSR

CHACHKO, A. G., PRIBORY I SISTEMY UPRAVLENIYA No 6, 1976 pp 4-6

of events that may bring about a given situation, and the construction of SET should take into account the immediate and long-time memory of man.

According to engineering psychology, man's immediate-memory capacity constitutes  $7 \pm 2$  symbols. In this case symbols are represented by the trunks and branches of SET. Correspondingly, the width and depth of analysis should not exceed the immediate-memory capacity. Taking into account technological considerations, the authors assume that the width of analysis should not exceed six branches and the depth of analysis -- eight levels. Such a proportion is achieved by the rational grouping of the starting material. Considerable reduction in the volume of information stored in the long-time memory of man is achieved by the introduction of the standard generalized SET.

The authors discuss in detail the construction and use of the generalized SET and illustrate it by two block diagrams. In their opinion, the study of SET should consist of the following steps: familiarization -- memorization -- acquisition of initial knowledge of analysis -- consolidation of know-how and formation of elements of automatism in operation.

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CHACHKO, A. G., PRIBORY I SISTEMY UPRAVLENIYA No 6, 1976 pp 4-6

At present the methods of training ASU operators in analyzing operational situations are being intensively elaborated at the Educational and Training Center of the Ukrainian SSR Minenergo [probably Ministry of Electric Power]. Over 150 SET have already been worked out. The training with the use of SET of the operating personnel of the Tripol'ye State Regional Electric Power Plant, the Kiev Heat and Electric Power Plant No 5, and other electric power plants were positively appraised. The Southern Branch of the ORGRES includes SET into its operational directions. 1 table; 2 block diagrams; 4 Russian references.



USSR

UDC 62-50:007.57

Unsigned

ERGATIC DYNAMIC CONTROL SYSTEMS

Kiev ERGATICHESKIYE DINAMICHESKIYE SISTEMY UPRAVLENIYA in Russian, Institute of Cybernetics of the Academy of Sciences Ukrainian SSR, "Nauk. dumka," 1975 160 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11, 1975 Abstract No 11G489K]

No abstract.

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USSR

UDC 62-50:007:57

IVAKHNENKO, A. G.

AT THE THRESHOLD OF THE ERA OF SYMBIOSIS OF MEN AND COMPUTERS

Kiev ERGATICH. DINAMICH. SISTEMY UPR. [Ergatic Dynamic Control Systems. Collection of Works] in Russian, "Nauk. dumka," 1975 pp 29-45

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11, 1975 Abstract No 11G490 from the resume]

[Text] The existence is established of a minimum series of criteria of mathematical models of complex objects with a gradual increase in the complexity of the model. Establishment of the existence of a minimum of these criteria allows the machine to be given the responsibility for the stage of selection of a unique model of optimal complexity, thus realizing the principle of self-organization. The possibility thus appears of constructing systems in which the optimal solution of complex problems is taken on by the machine. The man only indicates the criterion for selection of the model. 2 Figures; 2 Tables; 32 References.

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USSR

UDC 62-50:007:57

MELESHEV, A. M.

ONE STRUCTURAL POSSIBILITY FOR INCREASING THE ACCURACY OF TRACKING OF AN  
ERGATIC SYSTEM

Kiev ERGATICH. DINAMICH. SISTEMY UPR. [Ergatic Dynamic Control Systems.  
Collection of Works] in Russian, "Nauk. dumka," 1975 pp 85-86

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G492 from  
the resume]

[Text] A tracking system with a human operator is analyzed. The dependence  
of the spectrum of the error signal on the criterion of operation of the  
human operator is demonstrated. A tracking structure is suggested which  
increases the accuracy of tracking of a visible moving target. 4 Figures;  
2 References.

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USSR

UDC 62-50:007:57

DZEKH, V. P.

THE SYNTHESIS OF THE CONTROL SYSTEM OF AN AIRCRAFT PROVIDING THE OPTIMAL  
PILOTING CHARACTERISTICS

Kiev ERGATICH. DINAMICH. SISTEMY UPR. [Ergatic Dynamic Control Systems.  
Collection of Works] in Russian, "Nauk. dumka," 1975 pp 115-122

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G493 from  
the resume]

[Text] Based on a critical review of works defining acceptable areas of  
piloting characteristics of an aircraft, the concept of areas of compati-  
bility of the pilot and aircraft is introduced. It is suggested that the  
method of limiting systems be used for synthesis of a system providing the  
optimal dynamic characteristics of the aircraft. A functional is introduced  
which considers the deviation from the desired dynamics and limitation of  
the effectiveness of the control organs, and also the assigned level of  
piloting characteristics, minimization of which allows optimum synthesis  
to be assured. 4 Figures; 11 References.

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USSR

UDC 62-50:007:57

MEL'NIK, I. M.

ON SEVERAL FEATURES OF REPROCESSING INFORMATION IN THE SHORT-TERM  
MEMORY OF MAN

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering  
Psychology, Collection of Works] in Russian, No 2, 1975 pp 3-12

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No  
12G554]

[Text] The author describes experimental research carried out for  
the purposes of studying the possibility of logical reprocessing of  
information at the level of semantic conversions in a short-term  
memory. Figures 3; tables 4; references 9. Author's abstract.

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USSR

UDC 62-50:007:57

OVCHINNIKOV, V. S.

COMPLEX RECORDING IN DETERMINING PSYCHOPHYSIOLOGICAL CONDITIONS

Taganrog PRIKL VOPR INZH PSICHOL [Applied Questions in Engineering Psychology,  
Collection of Works] in Russian No 2, 1975 pp 18-23

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G525]

[Text] The author develops a complex of indicators which characterize the  
psychophysiological state of a person. He describes the laboratory arrange-  
ment which permits recording the required complex of indicators. Figure 1;  
Table 1; References 3. Author's abstract.

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USSR

UDC 62-50:007:57

VYSHCHEPAN, L. I. and VYSHCHEPAN, L. N.

ON THE CORRELATION BOND BETWEEN OPERATOR ERRORS

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology, Collection of Works] in Russian No 2, 1975 pp 37-46

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G522]

[Text] The authors establish the dependence of the correlation bond between operator errors and the operator's load. They determine the maximally allowable values of the coefficient of operator load. Figures 2; Tables 3; References 4: Authors' abstract.

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USSR

UDC 007:519+15.07

BELYAVSKIY, G. I.

ALGORITHMS FOR THE OPTIMAL COMPRESSION OF INFORMATION OBTAINED IN THE PROCESS OF AN EXPERIMENT

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology, Collection of Works] in Russian No 2, 1975 pp 47-53

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G275]

[Text] The author develops an algorithm for the optimal compression of a volume of experimental data under the condition of retaining the information contained in the data and detecting the factors which are essential from the viewpoint of influence on human behavior. References 2. Author's abstract.

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USSR

UDC 62.506.2:681.327.12

KOROLEV, A. V.

PLANNING ALPHANUMERICAL MEANS FOR DISPLAYING INFORMATION BY ALLOWING FOR  
THE POSSIBILITIES OF THE HUMAN VISUAL ANALYZER

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology,  
Collection of Works] in Russian No 2, 1975 pp 62-70

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G573]

[Text] The author examines questions of allowing for the possibilities  
of the visual analyzer in planning alphanumeric means of displaying  
information. He describes the procedure and computation for determining  
the number of symbols to be displayed on the cathode ray tube screen.  
Figure 1; Table 1; References 3. Author's abstract.

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USSR

UDC 62-50:007:57

BORISOV, S. V.

ON AN ENGINEERING AND PSYCHOLOGICAL EVALUATION OF "MAN--MACHINE" SYSTEMS

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering  
Psychology, Collection of Works] in Russian No 12, 1975 pp 71-74

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G524]

[Text] The author suggests a method which permits evaluation of the  
effectiveness of measures for ordering the operative field and simplifying  
the algorithm for operator work. He examines questions of accelerated  
tests of "man--machine" systems. Table 1; References 2. Author's  
abstract.

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USSR

UDC 62-50:007:57

MIKHAYLOV, V. B. and SMIRNOV, B. A.

THE NECESSITY OF MAKING PROFESSIONAL SAMPLING AS AN INDICATOR OF THE PERFECTION OF THE SYSTEM "MAN--MACHINE"

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology, Collection of Works] in Russian No 2, 1975 pp 75-79

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G523]

[Text] The authors examine the possible methods of determining the requirements for the psychophysiological characteristics of the operators. They cite the results of modeling the activity of the operator in the planned system. They obtained a mathematical expression for determining the indicator of perfection of "man--machine" systems. Tables 3; References 2: Authors' abstract.

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USSR

UDC 62-50:007:57

OSTAPENKO, V. N. and SMIRNOV, B. A.

PRINCIPLES AND METHODS OF QUALITATIVE EVALUATION OF THE RELIABILITY OF MAN--MACHINE SYSTEMS AT THE EARLY STAGES OF PLANNING

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology, Collection of Works] in Russian No 2, 1975 pp 80-89

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G521]

[Text] The authors reveal the methodological principles of evaluating the reliability of a man--machine system at early stages of planning. They suggest a method of evaluating the reliability of the system using generalized data on the reliability of the functioning of man and equipment. In evaluating the reliability of the system they take into account the influence of the conditions of the activity, the features of the interaction of the operators, the possibility of them correcting their own errors and the restoration of the equipment. Table 1; References 4. Authors' abstract.

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USSR

UDC 007.5:625

IVANCHENKO, V. N.

OPTIMIZATION OF CONTROL SYSTEMS FOR COMPLICATED AUTOMATED COMPLEXES AT  
LARGE SORTING GRAVITY YARDS

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology,  
Collection of Works] in Russian No 2, 1975 pp 90-97

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G945]

[Text] The author discusses the results of research on the engineering and psychological factors of large automated sorting gravity yards examined as a man--machine system. He explains the features of the controlled process and establishes typical mistakes and errors on the part of the operators. He developed a method of studying the "operator-gravity yard" system by allowing for the specifics of the sorting of the rolling stock. He establishes the causes for the low reliability of man in a control system. He develops special information logic devices and control panels which rationally redistribute the functions between the operator and the automated systems as well as optimizing the information field. Figures 4; Tables 2; References 3. Author's abstract.  
1/1

USSR

UDC 62-50:007:51

MEDVEDEV, V. P.

ENGINEERING AND PSYCHOLOGICAL EVALUATION IN CONSTRUCTING DEVICES FOR  
ADAPTIVE MONITORING OF KNOWLEDGE

Taganrog PRIKL VOPR INZH PSIKHOL [Applied Questions in Engineering Psychology,  
Collection of Works] in Russian No 2, 1975 pp 105-110

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G538]

[Text] The author examines questions of engineering and psychological evaluation of adaptive monitoring devices for didactic technology where the subject may be studied as the operation of a "man-machine" system. The evaluation is made by investigating each of the components of the device for the purpose of ensuring their adequacy in the optical conditions of the activity of the subject. References 12. Author's abstract.  
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USSR

UDC 62-50:007

SOTSKOV, B. S., and MITYUSHIN, F. F.

COMPUTER TECHNOLOGY IN SYSTEMS FOR CONTROLLING AIRCRAFT

Moscow TR MOSK AVIATS IN-TA [Works of Moscow Aviation Institute] in Russian  
No 322, 1975 143 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 5 1975 Abstract No 5G 700K by  
V. A. Nikitov]

[Text] The authors examine the use of a digital-analog converter of chain type. They discuss the possibilities of its use in a computer with optoelectronic logic elements; they describe the use of pattern logic for discriminating the circuits of the binary images. They suggest a method and algorithm for computing the amplitude-phase frequency characteristics of differential controls. They investigate a mathematical model of a specialized diode functional converter. They cite the methods and algorithms for computing the diode clippers on integrated operational controls, functional converters of two variables and quadratic approximation of the analytically given functions. They examine nonlinear low-frequency distortions in the transistor operational controls. They discuss the  
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SOTSKOV, B. S., and MITYUSHIN, F. F., TR MOSK AVIATS IN-TA No 322, 1975  
143 pp

features of large information-computer systems. The problem of finding ways of optimizing the process of data processing is solved. The authors examine real questions both of analog and of discrete computer technology.



USSR

UDC 621.3:061.4

ZHIVOV, N. P., Candidate of Technical Sciences

ERGONOMIC SOFTWARE OF STANDARD AUTOMATED CONTROL SYSTEMS FOR TECHNOLOGICAL PROCESSES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 6, 1976 pp 1-4

[Abstract] The basic tendency in the development of the operator interface of an ASU [automated control system] of continuous technological processes consists of the transition from the individual and selective control to a group control and management based upon universal and specialized switchable sensory-motor fields of various capacity. The switchable sensory-motor fields place at the operator's disposal in any technological situation the optimum choice of indicators and effectors. The author examines the five-level operator's interface based on the principle "from the general to the particular." The hierarchy of such an interface consists of the following functionally oriented zones of sensory-motor fields: 1) primary orientation (signalization of generalized maladjustments); 2) statistical appraisal of the state technological process and equipment; 3) search (group) control; 4) selective control; 5) individual control. The second, third and fourth zones are discussed in detail and illustrated by suitable block diagrams. 5 Figures.

1/1

USSR

UDC 519.283

YAKOVLEV, A. I.

GAME APPROACH TO THE DISTRIBUTION OF FUNCTIONS IN THE "MAN AND AUTOMATON" SYSTEM

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian No 3, May/Jun 76 pp 47-57

[Russian abstract provided by the source]

[Text] It is suggested that the distribution of functions in the "man and automaton" system be accomplished based on the game concept of obtaining the optimum guaranteed result. A discussion is given of a method of choosing the dimensionless factor and calculating its values so as to take into account the technical, medical-biological, and engineering-psychology requirements for the system and the subjective estimates of operators. Several estimates are obtained for analyzing the feasibility of using adaptive, randomized, and adaptive-randomized control strategies in the system. Figures 1; References 8.

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## D. Education

USSR

### VARIOUS COMPUTERS AVAILABLE TO STUDENTS

Moscow VESTNIK VYSSHEY SHKOLY in Russian ("In Order for Each Student to Master a Machine: A Review of Articles") No 7, 1976 pp 27-39

[Abstract] This article reviews the experience gained by different institutes and VUZ's in teaching their students how to use computers. The majority of VUZ's today have a sufficient quantity of the simplest computers, such as the Nairi and Promin', available for the students' needs, and even greater numbers of more advanced machines are being acquired.

Among the specific institutes mentioned is the Kramatorsk Industrial Institute, whose Chair of Metal-Cutting Machine Tools and Instruments began to use computers in 1973. The institute's computer center had Promin' digital computers and MN-7 analog computers. Kuybyshev Engineering-Construction Institute (Chair of Water Supply, Sewage Systems, and Hydraulics) has a Nairi-1, and Kursk Polytechnical Institute has a Promin'-2. Moscow Textile Institute's Chair of Automated Control Systems and Computer Technology, has available a Nairi-K, Minsk-32, and MN-7. Khar'kov Aviation Institute, which began to intensify the mathematical and computer training of students in 1970, has two computer centers. The large center boasts two YeS-1020's,  
1/2

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VESTNIK VYSSHEY SHKOLY No 7, 1976 pp 27-39

a BESM-4, and a BESM-4M. The small computer center consists of six computer rooms and is equipped with 14 small machines (Mir, Promin', and Nairi) and 85 keyboard computers of the type Iskra and Elektronika. In addition, eight computers of the type Mir-2 and Nairi have been installed in special departments and chairs. There are also 44 analog computers available to the students.

Finally, the Computer Laboratory of the Chair of Turbine Building of Leningrad Polytechnical Institute has three computers at its disposal: Promin', Nairi-S, and Odra-1204 (the latter is also used by other chairs). The Promin' is used exclusively for educational purposes and the students are allowed free access to it. In addition to educational uses, the Nairi-S is used to perform some calculations for educational-research work and for engineering computations. The Odra-1204 is the most advanced of the computers. Depending on its configuration, it may be compared to the Minsk-32 or M-220. It operates around the clock, in approximately two and a half shifts. It is chiefly used for graduate students and the institute's scientific associates; 30 percent of its time is reserved for students to solve scientific research problems.

2/2

USSR

UDC 62-50:007:41:581.3:378

RETINSKIY, V. S. and RETINSKAYA, I. V.

USE OF THE NAIRI-K SMALL COMPUTER FOR PROGRAMMED LEARNING AND TESTING

PROGRAMMIROVANIYE [Programming] in Russian No 2, 1975 pp 90-93

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G504 from the resume]

[Text] A description is presented of a method of developing testing and teaching programs for the Nairi-K computer; algorithms are presented for packing and unpacking of alphanumeric information; an example is presented of the logic portion of a program with random selection of questions. One version of a program for testing of knowledge on the theme "the operator of the Nairi-K machine is given." 2 Figures.

1/1

USSR

MEDVEDEV, V.

ROBOT ASSISTANT PROFESSOR IN USE

Moscow PROFESSIONAL'NO-TEKHNICHESKOYE OBRAZOVANIYE in Russian ("The Cybernetic Assistant") No 5, May 76 p 22

[Abstract] A robot assistant professor has been constructed by the Circle of Technical Creativity in the Electrical Engineering Office of the Gas and Steam Turbine Power Plant [GPTU] No 14, located in the city of Orsk, Orenburgskaya Oblast. It is assembled from readily-available parts and may be tuned and adjusted by any worker having some experience in design.

In addition to dictating a test for the students to write down, the robot can also test their knowledge through a special device installed in its "breast." The texts of questions and answer variations can be easily and quickly inserted and secured with the aid of thin plexiglass plates. The student's score is indicated by means of a digital display lamp. If a student needs to consult the robot, he pushes the "consultation" button and the correct answers light up on the robot's breast. The robot has

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MEDVEDEV, V., PROFESSIONAL'NO-TEKHNICHESKOYE OBRAZOVANIYE No 5, May 76 p 22

also been designed to monitor the noise level in the classroom by means of an acoustic relay; when the noise exceeds the permissible level, the relay switches on a tape recorder with a warning message.

The original article is accompanied by a photograph [not reproduced] having the following caption: A lesson is being given by the teacher along with his electronic assistant. The robot of GPTU No 14 in Orsk has proven to be a dependable educational aid. It is not merely an interesting mechanical toy, as such devices sometimes are, but rather a serious means to increase the effectiveness of a lesson.

2/2

USSR

Photo Caption

Moscow EKONOMICHESKAYA GAZETA in Russian (Photo Caption) No 38, Sep 76 p 13

[Text] A student computer hall has been established in Ryazan' Radio Engineering Institute. In the photo [not reproduced]: students are carrying out laboratory exercises.

USSR

UDC 62-50:531.396

KULAKOV, F. M. and LACHINOV, V. M., Leningrad

A METHOD OF CONTROLLING AN INDUSTRIAL ROBOT WHICH ELIMINATES THE "TRAINING" ROUTINE

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian  
No 3, May/Jun 76 pp 74-79 manuscript received 23 May 75

[Abstract] To train a robot to perform a specific operation is a very labor-intensive procedure requiring special skills and qualifications on the part of the operator and practically eliminating the feasibility of using robots in a system of totally automated multinomenclature production. Although theoretical formulas have been derived for writing the mechanical paths of a robot and its manipulator stages into the robot's memory, robots with the theoretically possible flexibility and universality do not yet exist. A discussion is given of a method of using the computer for fuller realization of the feasibility of a trained robot and for in certain cases eliminating the necessity of halting the manufacturing process to train the robot. The general sequence of operations of a robot is used to determine its "general path" regardless of the

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USSR

KULAKOV, F.M., and LACHINOV, V.M., IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA No 3, May/Jun 76 pp 74-79

equipment used and the part being machined. It is shown that this "general path" is invariable regardless of variations in even the more minute operations. The latter are analyzed utilizing systems of coordinates and intermediate variances entailed in changing the dimensions of the part are calculated by means of sufficiently simple algorithms rendering programming into the robot's memory possible. The compactness of the set of parameters necessary for programming makes it possible to set up a library of standard programs. The "general path" can be programmed rather simply owing to the list-type structure of the data and to the fact that the variable sections of the path are thought of as consisting of a fixed number of elements. Stage-one training takes place when the machine is set up at the work place, programming the memory by inputting data files in a given sequence, and with substantial changes in specifications while the system is functioning stage-one training can be repeated in full or in part by changing only a single data file, for example. Stage-two training while the robot is functioning, when a new part appears, is rather elementary and takes only a few minutes, requiring minimum skills and qualifications on

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USSR

KULAKOV, F.M., and LACHINOV, V.M., IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA No 3, May/Jun 76 pp 74-79

the part of the operator, owing to the simplicity of the library of standard programs. In a totally automated section with numerical program control stage-two training can be completely eliminated since only one element of the library has to be set for any part having standard dimensions. This makes control of the robot highly autonomous and makes operation convenient in this type of system even with an extensive nomenclature and frequent changes in types of parts being machined. The methods of representing data and shortening the training procedure suggested have been implemented with an algorithmic system for controlling an industrial robot which was developed on the basis of the ASVT-M-600 processor with a minimum memory capacity of 8k 16-bit words making it possible to directly control the drives of a moderate-size group of robots. This system utilizes the dialogue mode of operation and two-stage training. Functioning of the robots has to be stopped only when it is necessary to pretrain. Using the methods suggested it is possible to achieve a high degree of autonomy and universality even with the present level of hardware. Figures 3; references 5: 5 Russian.

3/3

USSR

Author not given

MULTIPLE-CONTROL ROBOT AT MACHINE-TOOL INSTITUTE

Moscow KRASNAYA ZVEZDA in Russian ("Scientists Conduct the Search") 18 Jun 76  
p 4

[Text] The robot created by specialists of the Experimental Scientific Research Institute of Metal-Cutting Machine Tools does not resemble a man very much. However, he has something that resembles an arm, but they call it the manipulator. The mechanism itself, controlled by an electronic device, is fixed on a suspended monorail track.

Now, in compliance with a command, the manipulator took a metal billet, fixed it in a lathe, waited for the cutter to travel over its surface, then took the finished part out and replaced it. The automatic equipment closely follows the accuracy of the robot's actions.

This robot is being called multiple-machine operator: on the monorail track it can drive from one working position to another, to machine parts on

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USSR

KRASNAYA ZVEZDA 18 Jun 76 p 4

various lathes, and change instruments. It does all this more accurately and faster than a man.

"Basic Directions for the Development of the National Economy of the USSR for 1976-1980 stress the necessity of undertaking the industrial production of programmed controlled instruments and devices for automatic manipulators." There are at present already four models of "intelligent" machines, developed at the Institute, that received a start in life. Their serial manufacture will begin in the current Five-Year Plan.

2/2

USSR

UDC 62-50:007:62

GALAGAN, N. I. and DOVGYALLO, T. P.

ON DATA DISPLAY IN A SYSTEM OF PLANNING THE ACTIONS OF THE PPR-2 ROBOT

Kiev VOPR TEORII AVTOMATOV, ROBOTOV I TSVM [Questions in the Theory of Automata, Robots and Digital Computers, Collection of Works] in Russian 1975 pp 47-59

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G631 by N. V.]

[Text] The authors mention that in creating automatic solution-searching systems, the choice of the method of data display is of great significance since it largely determines the scanning efforts necessary for solving the problem. They examine the question of data display in the PPR-2 programmed system being developed in the Institute of Cybernetics of the Academy of Sciences Ukrainian SSR; a further development in the PPR-1 system, it is designed for planning the actions of robots. The problems which it solves require for their solution an overall model of the environment, since a robot found in a natural environment must interact with a large number of inter-related objects. In the PPR-2 system the authors examine a set of three basic elements: the original model of the environment, the set of  
1/2

USSR

GALAGAN, N. I. and DOVGIALLO, T. P., VOPR TEORII AVTOMATOV, ROBOTOV I TSVM 1975 pp 47-59

operators which convert one model of the environment to another, and the purposeful condition. To describe these elements they use the input language of the system. The basic requirement in developing the input language was the requirement of universality necessary for working in various environments. Metalinguistic symbolics were used for defining the problem and the operators in the input language. Thus, the means of data display in the PPR-2 system makes it possible to work in complex environments characterized by a large number of inter-related objects. Figures 3; references 6.

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USSR

UDC 62-50:007:62

KUSSUL', E. M. and FOMENKO, V. D.

MOCK-UP OF THE "TAIR" AUTONOMOUS TRANSPORT ROBOT

Kiev VOPR TEORII AVTOMATOV, ROBOTOV I TSVM [Questions in the Theory of Automata, Robots and Digital Computers, Collection of Works] in Russian 1975 pp 60-68

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G632 by N. V.]

[Text] Work was begun in 1972 in the Department of Biocybernetics of the Institute of Cybernetics, Academy of Sciences Ukrainian SSR, on the creation of a mock-up for a transport robot, designed for a locale with a small number of roads. The basic purpose of the research was to create a system of control in the form of a neuronlike network with systems of intensification and braking (IBS) and to place it in the robot. The authors list the problems whose solution is necessary for creation of a transport robot. They describe the mechanics and system of sensors for the robot mock-up and its system of control. The planned experiments must give answers

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KUSSUL', E. M. and FOMENKO, V. D., VOPR TEORII AVTOMATOV, ROBOTOV I TSVM  
1975 pp 60-68

to the following questions: can a neuronlike network with IBS be organized for effective control of a transport robot in a natural environment; what is the approximate volume of equipment necessary for solving this problem; what parts of the overall problem of controlling movement are feasible to solve with the aid of the network devices and to what degree is the participation of computers desirable in control; what changes must be introduced in the principles of construction and technical realization of the network itself with the IBS. They describe the program of future research which suggests an expansion of the possibilities of the transport robot. A simultaneous result of future research must be solution to the question as to when the network methods are really preferable, in which instance does it make sense to use them in conjunction with other methods and also where their use is not feasible. Figure 1; References 4.

2/2

USSR

UDC 62-50:007:62

GALENKO, D. N.

ORIENTATION OF TRANSPORT AUTOMATA RELATIVE TO THE GOAL OF THE TRANSPORTATION

Kiev VOPR TEORII AVTOMATOV, ROBOTOV I TSVM [Questions in the Theory of Automatic Equipment, Robots and Digital Computers, Collection of Works] in Russian 1975 pp 78-85

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G633 by N. V.]

[Text] The author mentions that for automatic equipment traveling under conditions of a natural environment the solutions to the problem of orientation relative to a predetermined assigned point of movement are of great importance. "Knowledge" of the coordinates of the goal is necessary for making decisions on the tactics of the behavior of the automata in the process of realizing the overall plan of transportation. For the Autonomous Integrated Transport Robot [TAIR] developed in the Institute of Cybernetics of the Academy of Sciences Ukrainian SSR there has been planned and at the present time is being technically implemented a special system of orientation on the site of a natural polygon which permits the automatic

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GALENKO, D. N., VOPR TEORII AVTOMATOV, ROBOTOV I TSVM 1975 pp 78-85

equipment to effectively obtain variable values of the coordinates at any point. The system utilizes familiar radar methods of passive directions in a new original sequence of basic operations. The essence of the proposed method, determination of its location by an automaton, consists of the fact that the sources continuously radiate around a circle at a constant speed sharply directed signals from two predetermined points A and B spaced on the site, and at the moments when these signals are oriented strictly to the assigned sides of the light (North and West), short-term signals of a general directionality are radiated; these moments are fixed on the automaton; then the moments of orientation of the sharply directed radiations of the beacon are fixed on the automaton and the values of the variables are formed which are proportional to the angles between the directions from the indicated points A and B and the directions to the assigned sides of light. These values of the angles assign variable quantities to the coordinates of the automaton at the site of the special system. The author lists important functional subsystems and blocks of the complex for the case of realization of the procedure with the aid of radio devices. He shows that automation of the process of determining the coordinates is achieved by the proper preliminary orientation of

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USSR

GALENKO, D. N., VOPR TEORII AVTOMATOV, ROBOTOV I TSVM 1975 pp 78-85

the radio beacons, the use of special memory circuits for the assigned point of movement and for the values obtained for the variable coordinates at each given moment of time and a special circuit for the paired analysis of these values. Figures 2; Reference 1.

3/3

USSR

UDC 007.52

GLUSHKOV, V. M. and RYBAK, V. I.

PRIMARY TRENDS IN WORK IN THE AREA OF ROBOT BUILDING

Kiev OSNOVNYYE NAPRAVLENIYA RABOT V OBLASTI ROBOTOSTROYENIYA in Russian,  
Institute of Cybernetics of the Academy of Sciences Ukrainian SSR,  
"Theoretical Cybernetics" Section, Preprint 75-45, 1975, 23 pp, mimeo-  
graphed

[From REFERATIVNYY ZHRUNAL KIBERNETIKA No 11 1975 Abstract No 11G600K]

No abstract.

1/1

IV. NATURAL SCIENCE RESEARCH  
A. Biology and Medicine

USSR

ZYKOV, N., special correspondent of Nauka i Zhizn'

MEDICAL DIAGNOSIS CENTER EMPLOYS SARATOV COMPUTER

Moscow NAUKA I ZHIZN' in Russian ("Consultation by Correspondence") No 9, 1976 pp 70-71

[Abstract] A long-distance cardiodiagnosis and consultation center created five years ago by Saratov State Medical Institute and Saratov City Department of Public Health has proven very successful. According to Prof. E. Sh. Khalfen, director of the institute's Chair of Internal Diseases Diagnostics, the physicians worked with radioelectronics experts to develop and set up series production of the electrocardioconverter and other specialized apparatus which have made the center the only one of its kind so far. The electrocardioconverter, which externally resembles a portable "transistor," picks up the heart's weak biosignals, amplifies them, and converts them into signals which can easily be transmitted via telephone or radio to the cardiologist on duty in the remote consultation-diagnosis center. Here, an electronic computer instantaneously processes the cardiogram and prints out a diagnosis on an automatic typewriter and also transcribes it in the form of an ordinary graph on papertape. The electrocardioconverters is 1/3

USSR

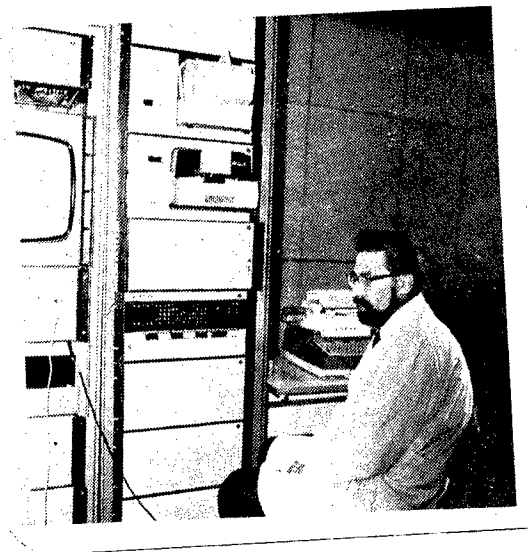
ZYKOV, N., NAUKA I ZHIZN' No 9, 1976 pp 70-71

extremely simple to use and small enough to fit into a woman's purse. It can be carried by the patient himself if this is deemed advisable.

The photograph shows the Saratov computer, which not only processes the cardiograms which it receives via communication channels from various points in the city, but also monitors the state of the severely ill patients in the institute's clinic who are connected to it. Changes in their condition are automatically printed out on the typewriter, and in extreme cases an alarm signal is sounded.

USSR

ZYKOV, N., NAUKA I ZHIZN' No 9, 1976 pp 70-71



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USSR

UDC 62-50:007:57

MOISEYEVA, N. I. and AKHUTIN, V. M. [Editors]

PROBLEMS OF MEDICAL CYBERNETICS

Moscow PROBLEMY MEDITSINSKOY KIBERNETIKI [Problems of Medical Cybernetics]  
in Russian, (Problems of Cybernetics, No 24), 1975 165 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G488K by  
M. R.]

[Text] This collection contains the following articles: some means of optimizing a "man-computer" system; classification of computer systems used for automatic processing of biological information and a general approach to the synthesis of automated complexes; problems of conversion, transmission and selection of medical-biological information; primary information sensors and the basic elements of biological measurement-information and control systems; the computer complex of a reanimation center; an automatic input system for archive data and primary processing of medical information on cardiologic patients; the control program for an artificial heart; the biocontrol system for artificial blood circulation developed by VNIIMT; systems for operational medical testing and medical examination systems; the use of a computer in quantum-chemical calculations; the electronic structure of pharmacologic

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USSR

MOISEYEVA, N. I. and AKHUTIN, V. M. [Editors], PROBLEMY MEDITSINSKOY KIBERNETIKI, (Problems of Cybernetics, No 24), 1975, 165 pp

compounds; some limitations of data processing by computer; theoretical and physiological principles of controlled experiments as a method of systems analysis; automatic controlled therapeutic actions in certain diseases of the mind; modulation of neuronal activity of the brain in a biocontrolled experiment; processes of transmission and coding of information in neuron systems of the brain lying at the basis of memory and temporal relationships; stress as a control principle (the role of the endocrine processes in integrative reactions); transient processes in microsystems of neurons in the visual structures of the brain; some aspects of self-regulation of nerve processes in the cerebral cortex; synchronization of the activity of individual neurons in the generation mechanisms of electroencephalograms.

2/2

USSR

IL'ICHEVA, S.

COLLABORATION OF AN INSTITUTE AND A HOSPITAL

Riga SOVETSKAYA LATVIYA in Russian ("The Union of Science and Labor")  
18 Aug 76 p 2

[Abstract] There is a creative union of science and labor between the Institute of Electronics and Computer Technology of the Latvian SSR Academy of Sciences and Hospital No 2 of the Ministry of Public Health, both of which are situated in the northeastern part of Riga. It is quite understandable that cybernetic resources have become indispensable in medicine. For example, biochemical analyses must be made precisely and rapidly and in large numbers, and can be efficiently performed by computer. In accordance with the plan for the development of the main directions of organization of labor in institutions of public health, the nearby hospital has become a unique testing ground for the scientific goals of the institute, including the collaboration of man and the computer in biochemical analyses and photo-electrocalorimetry. Work is also being done on the development of a large system which will store all available information about any patient and conveniently supply it to the physician.

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USSR

# DIAGNOSIS ON THE MONITOR SCREEN

Riga SOVETSKAYA LATVIYA in Russian 28 May 76 p 2

[Text] A cybernetic system which distinguishes normal cells from "inferior" ones in cytological analyses has been designed by Latvian scientists. Participants at the meeting of experts from the CEMA countries on the topic "Automating the Procedures of Cytological Diagnosis," held in Riga on 27 May, were familiarized with it in detail. In conversation with a LATINFORM correspondent, V. V. Kanep, chairman of the organizing committee for the meeting and Latvian SSR minister of health, said:

"Large-scale preventive examination of the population is becoming particularly important in the fight against oncological illnesses. To improve this work we must ease the intensive labor of the cytologists who study the cells under the microscope. The automated analysis system developed at the Institute of Electronics and Computer Technology of the Academy of Sciences Latvian SSR, with participation by medical scientists, offers such a possibility. It is an experimental device which combines optical-mechanical and logical units with an Iskra-125 desk-model computer.

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SOVETSKAYA LATVIYA 28 May 76 p 2

"All one must do is push a button on the control console and in a few minutes an evaluation of a preparation taken from the area of the organism being examined will be produced. The image from the microscope is projected onto the monitor screen, where the processes of automatic search and measurement of the cells may be observed. Data on each cell is fed into the computer which classifies it according to the given program. The inscription 'norm' or 'pathology' appears on the screen depending on the ratio of healthy and 'suspect' cells.

"It must be said that Latvia has become a national leader in the level of development of cytological diagnosis in oncology.

"All the CEMA countries are interested in the organizational and technical problems of improving this service. At the next meeting of experts steps are planned to coordinate work by scientists on standardizing the methodology and equipment for fully automated cytological testing."

2/2

USSR

UDC 62-50:007:57

DUDKIN, K. N. and GAUZEL'MAN, V. YE.

#### A NEURON MODEL

USSR author's certificate no. 453710, filed 14/17/72, published 3/02/75

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G520P]

[Text] Neuron models are known which contain action potential generators with output exciting and inhibiting signal shapers at their outputs and integrators in the exciter and inhibitor circuits. However, modules presently known do not provide for modeling of adaptation, accommodation and dynamic changes in the parameters of the membranes of actual neurons. The purpose of this invention is to expand the area of application of a model by providing for modeling of adaptation, accommodation and dynamic changes of the parameters of the neuron membrane. This is achieved by the fact that the model contains controlled conductivity units in the circuits for excitation and postsynaptic and presynaptic inhibition. The first inputs of the controlled conductivity units are connected to the outputs of the corresponding integrators, the output of the controlled conductivity unit in the excitation circuit is connected to the input of the action potential generator. The second input of the controlled conductivity unit in the excitation circuit

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USSR

DUDKIN, K. N. and GAUZEL'MAN, V. YE., USSR author's certificate no. 453710, filed 14/17/72, published 3/02/75

is connected to the output of the controlled conductivity unit of the postsynaptic inhibition circuit, while the second input of the controlled conductivity unit is connected to the output of the controlled conductivity unit in the presynaptic inhibition circuit.

2/2



YUGOSLAVIA

COMPUTERIZED HOSPITAL INFORMATION SYSTEM

Zagreb AUTOMATIKA in Serbo-Croatian No 3-4, 1975 p 166

[Text] At a hospital center in Munich it is sufficient for the patients to submit their data only once, upon admission. By means of a terminal with a screen, this information is registered in the central computer where it is permanently available to all other hospital services such as administration, supplies department, and hospital medical departments. At the final stage this information system will include 4000 beds of the hospital center. The central computer is a Siemens make with memory 384K. It will be joined by more auxiliary computers to perform separate functions: in the central laboratory of clinical chemistry, research laboratory, cardiological services, intensive care departments, nuclear medicine, etc.

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## B. Physico-chemical and Earth Sciences

USSR

BESKOVA, T.

### COMPUTER INVESTIGATIONS OF CRYSTAL STRUCTURES NOMINATED FOR STATE PRIZE

Moscow MOSKOVSKAYA PRAVDA in Russian ("The Computer Investigates Crystals")  
18 Jul 76 p 2

[Abstract] Hardly anyone thinks of connecting his moving to a new address with successes in crystallography. However, that science, at first glance far from ordinary life, has a direct relationship to new homes. Investigations of the crystallographic structure of calcium compounds form a necessary scientific basis for the development of new types of cement and concrete. At the beginning of this century the famous Russian scientist Ye. S. Fedorov derived the laws of the spatial symmetry of crystals. A very old science was as it were born anew in its own new manifestations. Structural crystallography opened up extensive possibilities of studying crystals of a very diversified nature--from metals and alloys to proteins and nucleic acids. However, the joy of scientists was darkened by the length and laboriousness of the investigations. Even 15-20 years ago the decipherment of the atomic structure of a crystal of even a relatively simple compound required 2-3 years. True, the scientific worker who had done it had all grounds for  
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USSR

BESKOVA, T., MOSKOVSKAYA PRAVDA 18 Jul 76 p 2

presenting that work as partial fulfillment of the requirements for the degree of candidate of sciences. However, life persistently demanded reduction of the time required for investigations and advances in the area of analysis of complex crystals. That was needed not only by science but also by branches of technology in which semiconductor, magnetic, optically active and other types of crystals are used. The problem was successfully solved by using computers in structural investigations.

At the computer panel is a researcher. "Who are you?" asks the machine. It must know that so that no one except the man it knows can interfere and disrupt the course of an experiment. "I am Ivanov." "What do you want to do?" "I want to measure the intensity of beams of x-radiation scattered by a crystal," Ivanov replies.

The machine takes over the matter. It gives the task to a special instrument, watches over the precision of its work, selects the optimal variant out of tens and hundreds of possible conditions of measurement and analyzes the obtained data. If the experiment proceeded successfully, that developed procedure can be fed into the machine and the machine will measure another similar crystal without the intervention of man.

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BESKOVA, T., MOSKOVSKAYA PRAVDA 18 Jul 76 p 2

An intelligent, conscientious machine. It was made given these traits by the co-workers of the Section of Automation of Structural Research of the Institute of Crystallography imeni A. V. Shubnikov of the USSR AS Academy of Sciences. They were the first in the country to use electronic computers to control complex and laborious experiments in structural crystallography. However, in the given case the experiment is a critical part of the investigation but not the most complex. Most of the labor was expended previously on the construction of an atomic model of the crystal. Now most such investigations, whether of complex alloys or biologically active substances, are conducted in our country by means of the complex mathematical programs "Kristall" and "Rentgen." Those programs were created jointly by specialists of the Institute of Crystallography and the Institute of Chemical Physics of the USSR Academy of Sciences and the Faculty of Computer Mathematics and Cybernetics of Moscow State University. "Kristall" and "Rentgen" make it possible to solve automatically all the main tasks--from primary processing of experimental data to the analysis of the position of atoms in a crystal and the characteristics of the thermal vibrations of these atoms.

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USSR

BESKOVA, T., MOSKOVSKAYA PRAVDA 18 Jul 76 p 2

However, the maximal effectiveness of structural investigations is achieved when special systems are used which combine automatic diffractometers controlled by small computers and a large computer. The Special Design Bureau of the Institute of Crystallography and the Leningrad Production Association "Burevestnik" ["Stormy Petrei"] have developed and started series production of diffractometric complexes which include a third-generation computer. Those instruments are being successfully used and are solving complex scientific and technological problems in Moscow, Kishinev and other cities of the country.

The system of automation of crystallographic investigations reduces the time required for structural determination from 2-3 years to several weeks. The fact that this work has been nominated to the competition for a 1976 USSR State Prize testifies to its importance and significance.

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USSR

UDC 681.322

GUSEV, V. A., DENISOV, N. F., NEKHANEVICH, E. L., POPOV, V. M., ROMANOV, A. V., SIDOROV, V. A., SYSOLETTIN, B. L., and SHUVALOV, B. N.

#### A COMPUTER SYSTEM FOR AUTOMATING EXPERIMENTS

Novosibirsk SISTEMA EVM DLYA AVTOMATIZATSII EKSPERIMENTOV [A Computer System for Automating Experiments] in Russian, Preprint IYaF 75-84 from the Institute of Nuclear Physics [IYaF], Siberian Department of the Academy of Sciences USSR, 1975, 8 pp, mimeographed

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5, 1976 Abstract No 5B236]

[Text] The authors describe a computer system developed in the Institute of Nuclear Physics of the Siberian Division of the Academy of Sciences USSR for control, monitoring of apparatus and preliminary processing of information in experiments on high energy physics. The system consists of peripheral small computers of the M-6000 type placed near the experimental set ups and a central small computer installed in the computer center of the Institute. The central computer is equipped with an external memory made of magnetic disks and connected with two Minsk-32 computers. Communication 1/2

USSR

GUSEV, V. A., DENISOV, N. F., NEKHANEVICH, E. L., POPOV, V. M., ROMANOV, A. V., SIDOROV, V. A., SYSOLETTIN, B. L., and SHUVALOV, B. N., SISTEMA EVM DLYA AVTOMATIZATSII EKSPERIMENTOV 1975 8 pp

between experimenters and computers is accomplished with the aid of teletypes, and alphanumeric and graphic displays. Figures 2; References 9. Authors' abstract.

USSR

UDC 62-50:007:621.3

NEZHMETDINOV, T. K., SITNIKOV, YU. K. and TARKEYEV, A. N.

THE ROLE OF THE COMPUTER IN PLANNING OF ELECTRONIC SYSTEMS

Kazan', PRIYEM I OBRABOTKA INFORM. V STRUKTURNO-SLOZHN. SISTEMAKH [Reception and Processing of Information in Structurally Complex Systems Collection of Works] in Russian, Kazan' University No 4, 1974 pp 145-153

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G730 by N. V.]

[Text] It is demonstrated that full or partial automation of the process of planning of a system is possible, since this process contains operations which have been successfully performed using computers. These operations include the operations of collection, ordering and inspection of information, creation and investigation of a mathematical model of a system and an iterative optimization process for the structure of a system. Two methods are presented which have become common in connection with the use of computers in the planning and investigation of electronic systems. It is noted that only operation in real time allows the planner to intervene in the process of planning, to make changes in the structure and parameters of the system studied, i.e., it allows him to introduce to the automatic process a  
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USSR

NEZHMETDINOV, T. K., SITNIKOV, YU. K. and TARKEYEV, A. N., PRIYEM I OBRABOTKA INFORM. V STRUKTURNO-SLOZHN. SISTEMAKH No 4, 1974 pp 145-153

parameter which is usually called intuition and experience. The role of the computer in this case is to create an information base and allow for rapid checking of the correctness of intuitive solutions. It is noted that in the near future we should not expect the appearance of systems capable of fully producing working documentations for systems on the basis of assigned input and output signals, without intervention by man. At the present time, it is obvious only that it is possible only to fully automate the planning of components, documentation, as well as analysis of electronic circuits. The need is emphasized to solve the following two main problems: creation of a method of optimization of synthesis based on assigned criteria (including structural optimization of a system) using operational interaction with the computer; automation of construction and analysis of models of complex systems. It is suggested that the solution of these problems be sought not in attempts at full automation, but rather in increasing the reliability and speed of production of results based on effective interaction between the planner and the computer. 1 Figure; 17 References.

2/2

C. Other

USSR

ANALYSIS AND RECOGNITION OF SPEECH SIGNALS ON A COMPUTER

Moscow VYCHISL TSENTR AN SSSR [Computer Center of the Academy of Sciences of the USSR] in Russian 1975 171 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V1050 K]

[Text] This collection contains articles on investigation of speech signals with the aid of computers. A study is made of both questions of developing a specialized software for these purposes and questions of creating a special apparatus. The problem of utilizing language syntax for purposes of automatic speech recognition is touched upon. Abstracts by article.

1/1

V. INFORMATION SCIENCE  
A. Information Services

USSR

YES-1020 USED IN LENINGRAD INFORMATION CENTER (Photo Caption)

Leningrad LENINGRADSKAYA PRAVDA in Russian 8 Sep 76

[Text] The information-reference data bank of the Leningrad Center for Scientific-Technical [LentSNTI] Information now contains 25 million documents. During 1975, dozens of enterprises in the city and oblast saved a total of approximately 17 million rubles by adopting innovations cited in the materials held by LentSNTI.

Now a YeS-1020 electronic computer is being assimilated here, as called for by the plan for the introduction of a republic automated system for scientific-technical information. It will be used for rapid solution of a wide range of tasks concerned with providing information to specialists of the Severo-Zapadnyy Region through the use of data from all-union and sector-of-industry institutes for scientific-technical information throughout the country.

In the photo [not reproduced]: computer specialists Yu. Shteynbakh, N. Zholneruk, and L. Dvorkin are debugging the computer.

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HUNGARY

UDC 53.08:681.3.07:681.32

ANTOS, G., KOROSI, I., and ZIMANYI, I.

A DATA COLLECTION DEVICE WITH A COMPUTER OF THE MINIDATA II TYPE

Budapest MERES ES AUTOMATIKA in Hungarian No 6, 1976 pp 200-204

[Abstract] This article acquaints the reader with a data collection system that uses a computer of the type MINIDATA II. The article first discusses briefly the advantages of the system, then deals with the design of its hardware and secondly with its software.

The system consists of some individual elements of a data collection device of the type MINIDATA I and of a desk model computer of the type EMG-666. The modular structure of the MINIDATA I can also be employed advantageously in the case where the system is controlled by the desk computer. Connection between the desk computer and the individual functional units is established with the help of a linkage unit.

The software also has a modular structure. A series of compatible sub-programs are used to operate the individual functional units and to execute  
1/2

HUNGARY

ANTOS, G., KOROSI, I., and ZIMANYI, I., MERES ES AUTOMATIKA No 6, 1976  
pp 200-204

the basic steps which are characteristic of all data gathering problems. The user need write only the programs for processing non-standard data and the control program which manages the entire system.



USSR

GruzINFORM [Georgian News Agency]

AN AUTOMATIC INFORMATION RETRIEVAL SYSTEM

Tbilisi ZARYA VOSTOKA in Russian 20 Aug 76 p 2

[Text] The Automatic Information Retrieval System (AIPS) "Mikromashina" [Micromachine] was developed in Tbilisi at the All-Union Scientific Research Design and Planning Institute of the Technology of Low-Power Electrical Machines. The system will provide scientists and specialists with the necessary information in the fields of design, technology, economics, and the organization of the manufacture of low-power electrical machines.

Previously, the search for reference material required about two to three months, but with the introduction of this innovation, the scientists receive the necessary information within 10-15 minutes. For this purpose, the demand for information of interest to them is being coded and introduced into the memory of an electronic computer. In order to obtain an answer, the scientist needs only to remind it about himself with a new demand. By "collating" the code of the first and second demands, the machine delivers the necessary information without delay. The system is also of interest for the fact that  
1/2

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ZARYA VOSTOKA 20 Aug 76 p 2

it permits its multiple and multi-purpose utilization with one-time processing and input of information.

The computer of the system handles two modern languages, Russian and English. It is envisaged to use this speaking variant for the coordination of work concerning scientific and technical information in the field of low-power electrical machines, within the framework of the international system of scientific and technical information of the CEMA countries. The annual savings from its introduction amounts to 27,000 rubles.

The main committee of the VDNKH [Exhibition of Achievements of the National Economy USSR] and the board of directors of the Exhibition have appraised the advantages which the national economy will derive from the introduction of this system. The author of the development, head of a department of the Institute, Sh. Gogichayshvili, was awarded a Golden Medal. In addition, the Tbilisi developers have received three more Golden, 11 Silver and 41 Bronze Medals. The exhibits, created by the scientists and manufactured by the experimental plant of the Institute, were directly sent from the Exhibition to the electrical engineering plants in Lobnya, Mazheykyay, Pskov, Voronezh, and other cities of the country.

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USSR

UDC 681.327.2

SHTURMAN, YA. P.

METHODS AND RESOURCES FOR PREPARING DATA FOR INPUT INTO INFORMATION SYSTEMS

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA. SERIYA 1. ORGANIZATSIYA I  
METODIKA INFORMATSIONNOY RABOTY in Russian No 7, 1976 pp 23-28

[Abstract] Existing devices and practices for preparing data for input to computers are reviewed. Various hardware units for recording data on machine readable media, both punched and magnetic, are described. A classification of autonomous devices and centralized data preparation systems is given; it includes a comparative analysis and typical models. Multiple keyboard input to a centralized system is shown to be the best solution for a certain developmental state of the "Assistant" information system being designed at VINITI [All-Union Institute of Scientific-Technical Information]. The use of visual displays in group videovisualization systems is a problem to be decided on the basis of all factors, including cost.

1/1

USSR

UDC 62-50:007:65

VERYUZHSKIY, YU. V., DEKHTYARYUK, YE. S., NIKULIN, V. N., PROTSENKO, N. M.,  
SINYAVSKIY, A. L. and FIALKO, YU. I.

ORGANIZATION OF SOFTWARE FOR A SYSTEM OF STATISTICAL PROCESSING OF  
EXPERIMENTAL DATA

Kiev AVTOMATIZ NAUCH ISSLED I TEKHN PODGOTOVKI [Automation of Scientific  
Research and Technical Preparation of Production, Collection of Works]  
in Russian 1975 pp 3-7

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 5 1976 Abstract No 5G 486  
by B. A. Kachalov]

[Text] The authors examine the features of designing a system of software necessary for the processing of arrays, the lengths of which significantly exceed the length of the array placed in the operative memory of the computer. The system is realized on an M-222 type computer and includes a library of finished programs in the machine codes arranged on the system's magnetic tape in one program per zone; the operating system calls one of them into the operative memory, adjusts it, completes and converts it to the next one as needed. A description is given of the operating system consisting of

1/2

USSR

VERYUZHSKIY, YU. V., DEKHTYARYUK, YE. S., NIKULIN, V. N., PROTSENKO, N. M.,  
SINYAVSKIY, A. L. and FIALKO, YU. I., AVTOMATIZ NAUCH ISSLED I TEKHN  
PODGOTOVKI 1975 pp 3-7

a monitor, service programs, a library of fixed sets, request cards for the system and programs, and also a certification of processing. The operating system foresees the possibility of redundancy of the resident, certification and current information on a special redundancy tape. The existing program for editing the system tape permits introducing any changes into the programs of the system. Figure 1.

2/2

USSR

UDC 002.6

LEVIN, L.B.

THE SCIENTIFIC-AND-TECHNICAL REVOLUTION AND SCIENTIFIC-AND-TECHNICAL INFORMATION

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA, SERIYA 1 in Russian No 6, 1976  
pp 11-12 manuscript received 22 Oct 75

[Abstract] Progress in science and in computer technology in particular has created a whole new artificial environment existing alongside man's natural environment. Although the number of computers is still not so large as to speak of the existence of a principally new environment and although it is still difficult to predict the social implications of the evolution or revolution of computer technology, it is nevertheless necessary to monitor manufacturing and communications phenomena on a still wider scale crossing regional and even national boundaries. This represents a repudiation of private ownership of the tools and means of production. This applies in particular to the system of scientific-and-technical information. Further progress requires the cooperation and integration of national and international information agencies, which is possible only through public ownership of the means of production. The exchange

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LEVIN, L.B., NAUCHNO-TEKHNICHESKAYA INFORMATSIYA, SERIYA 1 No 6, 1976 pp 11-12

of data files on specific branches of knowledge and specific problems is necessary to avoid unnecessary duplication. Information science, a new discipline, originated in the USSR at VINITI -- the All-Union Institute of Scientific and Technical Information -- which is the largest information center. The creation of VINITI's Integrated Information System (IIS) began with the development of information science as a discipline. VINITI's "ASSISTENT" IIS is one of the major steps in the development of the GSNTI [State Network of Scientific-and-Technical Information] and will serve to create effective cooperation not only with member countries of CEMA but also with the most important capitalistic countries, such as France, FRG, USA, and England. The IIS will eliminate the presently prevalent duplication of documentation processing and will stimulate cooperation both within the USSR and internationally, making possible a reduction in the inflow of information to any one center, the exchange of data on magnetic tape, a reduction in the amount of editorial and publishing work, in particular in the amount of typing and proofreading, and in the time required for publishing data reports. The joint use of hardware and common communications formats will facilitate the exchange of data-search files on magnetic

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LEVIN, L.B., NAUCHNO-TEKHNICHESKAYA INFORMATSIYA, SERIYA 1 No 6, 1976 pp 11-12

tape between different centers. The use of remote data-processing systems will make it possible to eliminate the necessity of relying on the postal service. This "integrated system of integrated systems" will make it possible to predict science's "points of growth" and to shorten the time required to put the achievements of science into concrete form, as well as to reduce the expense of processing, storing, and searching scientific-and-technical information.

3/3

VI. THEORETICAL FOUNDATION  
A. General Problems

USSR

UDC 681.3.008

GRAEF, M. and SCHUBRING, G.

LONG-TERM UTILIZATION OF COMPUTERS

BETRACHTUNG DER LANGFRISTIGEN RECHNERNUTZUNG, Angew Inform, in Russian Vol 17,  
No 6, 1975 pp 233-236

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNICA No 11 1975 Abstract No 11B113 by M. A.]

[Text] The authors give the results of analyzing the operating time of a computer based on 49 similar annual reports obtained at computers centers of universities and scientific research institutes. The analytical results are reduced to the following: 1. relative downtime of computers is reduced only minimally by intense preventative servicing; 2. no dependence exists between the overall running time and the amount of the relative computer downtime; 3. downtime does not change practically at all with an increase in the lifetime of the computers although there is a tendency to a slight reduction in downtime in the third year of utilization. Figures 4; References 4.

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## HUNGARY

RENYI, Istvan, staff scientist at KFKI [Central Research Institute for Physics],  
and SANDOR, Laszlo Tamas, Dr, staff scientist at KFKI

### HARDWARE AND SOFTWARE CONDITIONS FOR THE USE OF MICROPROCESSORS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 11 No 2, 76 pp 128-132

[Abstract] The authors briefly review the means of hardware development, some aspects of software preparation, and the various programs such as translation, editor, simulator, and monitor programs which are prerequisites for the successful use of microprocessors. They differ from those used in wired systems. Then, they describe the minicomputer-based microcomputer development system developed at the KFKI. This system is a combination of the TPA-i small computer and a universal multimicroprocessor system which is designed for high-speed transmissions of any type (primarily eight-bit organized), capable of simultaneously serving several microprocessor modules. It employs a bus system, and features an interface between its two main components which uses a "real-time system monitor" program packet which handles the entire microprocessor system through the console of the minicomputer. Figures 2; references 16: 2 Hungarian, 1 Russian, and 13 Western.

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B. Automatic Control and Control Systems

USSR

UDC 62-50:007:57

PAVLOV, V. V. and YAKOVLEV, O. S.

SYNTHESIS OF ERGATIC NONSTATIONARY CONTROL SYSTEMS

Kiev ERGATICH. DINAMICH. SISTEMY UPR. [Ergatic Dynamic Control Systems. Collection of Works] in Russian, "Nauk. dumka," 1975 pp 78-85

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G491 from the resume]

[Text] An analytic method is suggested for synthesis of algorithmic structures for control of nonlinear unstable objects. The method developed solves the problem of the first stage of structural synthesis of ergatic systems, intended for stabilization of programmed motion. The indicators produced characterize the capabilities of the human operator in the control system and can be used in the stage of parametric synthesis of an ergatic system. 7 References.

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USSR

UDC 62-50:007:65

DZEGELENOK, I. I.

OPERATIVE DISTRIBUTION OF COMPUTERS IN A NETWORK DURING THE SOLUTION OF LARGE PROBLEMS

Moscow TR MOSK ENERG IN-TA [Works of the Moscow Power Engineering Institute] in Russian No 247, 1975 pp 109-113

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G740 by V. K.]

[Text] The author examines an algorithm for solving problems of a nonlocal nature in the presence of dispersed computer networks. Effective solution to large problems is achieved as a result of concentration and specialization of the computer resources. The examined algorithm permits dynamic distribution of the unlike resources (including communication channels) of the network by a rapid transition to optimal configuration of the network both by varying the execution time of the stage-by-stage problems and by assigning supplemental resources.

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USSR

DZEGELENOK, I. I.

OPERATIVE DISTRIBUTION OF A COMPUTER IN SOLVING LARGE PROBLEMS ON A NETWORK

TR MOSK ENERG IN-TA [Works of the Moscow Power Engineering Institute] in Russian No 247, 1975 pp 109-113]

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V985]

[Text] None.

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USSR

UDC 62-52:007.5:330.115

VLASOVA, L. V.

ON THE DETERMINATION OF THE TIME FOR PROCESSING UNITS OF INFORMATION ON A COMPUTER FOR PROBLEMS OF THE AUTOMATED INDUSTRIAL CONTROL SYSTEM "SVYAZ'"

SB NAUCH TR TSNII SVYAZI [Collection of Scientific Works from the Central Scientific Research Institute of Communications] in Russian No 1, 1975 pp 82-89

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G750]

[Text] The author examines a method of determining the mean time of processing units of information in the problem whose algorithm is represented by a set of standard procedures for processing economic information. She cites the numerical values of the mean time and the confidence boundaries of the time for processing the information units for computers such as the Minsk-22 and the Minsk-32. Figure 1; References 9. Author's abstract.

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USSR

UDC 681.325.65:621.377.622.322.5

BOYARCHENKOV, M. A., RAYEV, V. K., SEVOST'YANOV, V. V. and CHMYKHOV, A. YE.

SEVERAL QUESTIONS IN THE CONSTRUCTION OF DOMAIN INTEGRATED MICRO-CIRCUITS FOR UNITS OF AUTOMATIC EQUIPMENT AND COMPUTER TECHNOLOGY

TR IN-TA ELEKTRON UPRAVL MASHIN [Works of the Institute of Electronic Control Machines] in Russian, No 44, 1974 pp 35-39

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11 1975 Abstract No 11B161 by P. K.]

[Text] The authors describe a new class of instruments whose physical base is the utilization of the motion of areas of spontaneous magnetization (domains) in magnetic materials, on the basis of which it is possible to construct functional elements and means of computer technology. The technological process of processing the domain-containing materials includes the growth and processing of monocrystalline substrates, epitaxial accretion, modification of the surface layer by means of diffusion or injection of ions, vacuum

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USSR

BOYARCHENKOV, M. A., RAYEV, V. K., SEVOST'YANOV, V. V. and CHMYKHOV, A. YE., TR IN-TA ELEKTRON UPRAVL MASHIN, No 44, 1974 pp 35-39 [From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11 1975 Abstract No 11B161]

sputtering, etcetera. The authors introduce the concept of a class of domain integrated circuits (DIC), the separate elements of which may be interconnected not only electrically but also magnetically. The developed DIC utilize materials which contain domain carriers of information with a density from  $10^3$  to  $10^8$  bits/cm<sup>2</sup>. For control of the domains they use a system of thin-film domain-propelling application elements. The limit for increase in the degree of integration in microcircuits with flat domains is superposed by the "channel" geometry of the low-coercive segments of permalloy containing the moving domains. Users of the DIC may be new generations of computers utilizing associative systems of memory, solid-state address information storage, side systems of logic, etcetera. Figure 1; references 5.

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USSR

UDC 51:681.3.01

ZAYTSEVA, ZHANNA NIKOLAYEVNA, Candidate of Technical Sciences, Senior Scientific Associate of the Moscow Scientific Research Center, and SHTEYN, MARK YELIZAROVICH, Candidate of Technical Sciences, Chief of the Laboratory, Moscow

#### HAMILTONIAN CYCLES IN SOLVING LAYOUT PROBLEMS

Kiev KIBERNETIKA in Russian No 3, May-Jun 76 pp 70-73

[Abstract] A generalized algorithm is proposed for solving problems of the layout of modules in electronic computers with arrays of any level when positions and modules laid out are uniform. The suggested algorithm does not depend on design parameters, but is based on optimal Hamiltonian routes in a graph. 5 Figures; 4 Russian References. Manuscript received 29 Jan 74.

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USSR

UDC 681.14

PETRENKO, ANATOLIY IVANOVICH, Doctor of Technical Sciences, Professor of the Kiev Polytechnical Institute, and TETEL'BAUM, ALEKSANDR YAKOVLEVICH, Candidate of Technical Sciences, Senior Scientific Associate of the Kiev Polytechnical Institute

#### REDUCTION OF PROBLEMS OF DESIGNING RADIOELECTRONIC DEVICES TO BIVALENT PROGRAMMING

Kiev KIBERNETIKA in Russian No 3, May-Jun 76 pp 64-69

[Abstract] The authors discuss a number of problems of a combinatorial nature arising in the design of complex electronic devices, viz., the layout of loosely-coupled components of these devices (modules, integrated circuits, panels, racks, cabinets, etc.), the distribution of adequate components on an assembly plane, the layout of rectangular forms of random configuration, the layerwise arrangement of components, the assembly of components in modules, etc., and show that such problems can be reduced to bivalent programming. They conclude, however, that in view of labor-consuming difficulties involved, it is not possible to obtain precise solutions for real devices and therefore approximate, well-realizable

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PETRENKO, ANATOLIY IVANOVICH, and TETEL'BAUM, ALEKSANDR YAKOVLEVICH,  
KIBERNETIKA No 3, May-Jun 76 pp 64-69

algorithms should be devised and used for solving a majority of design problems. 3 Figures. 1 Russian and 2 Western References. Manuscript received 3 Jul 74.

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C. Game Theory and Operations Research

USSR

UDC 51:621.391

SHABAS, LEONID DMITRIYEVICH, Candidate of Technical Sciences, Head of a Department of the Scientific Research Institute of Peripheral Equipment of the Production-Technical Association VUM, Kiev

TRAINING ALGORITHM FOR THE SEQUENTIAL BRANCHING METHOD OF PATTERN RECOGNITION

Kiev KIBERNETIKA in Russian No 3, May-Jun 76 pp 74-81

[Abstract] A training algorithm for the sequential branching method of pattern recognition is described. Among its advantages is a low outlay for computing operations and storage. The measurement of signs is carried out with variable accuracy depending on the necessary level of recognition resolving power. The accuracy of signs measurement is determined by decision function conformable to the given training step. The recognition resolving power may be increased by building up storage without changing its organization or previously stored information. The algorithm is convergent. Summary outlay for storage and computing operations of the space of signs with dimensionality  $n = 2$  is thrice less than in algorithms approximating decision functions by hyperplanes, twice less than in algorithms approximating decision functions by hyperspheres, and 92 times less compared with algorithms 1/2

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SHABAS, LEONID DMITRIYEVICH, KIBERNETIKA No 3, May-Jun 76 pp 74-81

approximating decision functions by polynomials of the fourth power. For  $n \rightarrow \infty$  these estimates are 5, 4 and over 100, correspondingly. 3 block diagrams, 2 figures. 5 Russian references. Manuscript received 1 Aug 73.

USSR

UDC 681.3.06

DANIL'CHENKO, P. D. and SHARONOV, V. B.

OPTIMAL DISPATCHING OF COMPUTATIONS IN AN ON-BOARD DIGITAL COMPUTER WITH LIMITED BUFFER MEMORY

Khark'kov RADIOELEKTRON LETATEL'N APPARATOV [Radioelectronics of Aircraft, Collection of Works] in Russian, Khar'kov Aviation Institute, No 7, 1975 pp 127-132

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B54]

[Text] The authors resolve the question of effective organization of the computer process in an on-board computer with limited buffer memory by the optimal designation of priorities for the various problems. On the basis of the principle of optimality they develop an algorithm for designating the discipline of servicing with an assigned amount of input flows of information, number of absolute and relative priorities. The problem was solved for selecting the number of priorities by allowing for the cost  $1/2$

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DANIL'CHENKO, P. D. and SHARONOV, V. B., RADIOELEKTRON LETATEL'N APPARATOV No 7, 1975 pp 127-132

of the dispatcher system. Optimization is done by three criteria simultaneously: losses due to waiting in line, losses caused by the omission of a solution to individual problems because of overloading of the buffer memory, and cost of the system. References 6. Authors' abstract.

USSR

UDC 681.322

AVEN, O. I.

OPTIMIZING THE UTILIZATION OF COMPUTER SYSTEMS

Moscow PROBL UPRAVLENIYA [Problems of Control, Collection of Works] in Russian 1975 pp 74-79

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B217]

[Text] The author examines problems of optimizing the utilization of computer systems including an experimental study of the characteristics of the computational process in the course of exploitation of computers and debugging of the operating system for specific conditions of exploitation, development of analytical models for the functioning of the computer and choice of optimal algorithms for dynamic control of the computer resources. References 9. Author's abstract.

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USSR

UDC 681.326

BUZOVSKIY, O. V. and CHEBANENKO, T. M., Kiev Polytechnic Institute

LANGUAGE FOR DESCRIBING DIGITAL DEVICES

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 2, Mar-Apr 76 p 65

[Review of book DM-386 Yazyk Opisaniya Tsifrovyykh Vychislitel'nykh Ustroystv [Language for Describing Digital Devices] by O. V. Buzovskiy and T. M. Chebanenko, Kiev Polytechnical Institute, Kiev, 1976, 15 pp; Manuscript deposited in the GRNTB [expansion unknown] of the Ukrainian Scientific Research Institute of Scientific-Technical Information, Gosplan Ukrainian SSR (Kiev-171, ul. Gor'kogo, 180), 26 February 1976]

[Text] The authors examine the requirements for the form of describing digital computer devices that is suitable for utilization in automated systems of planning. They suggest a form of description which satisfies the imposed requirements and which is universal for the stages of structural, logic and technical planning of the digital computer. They cite the

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BUZOVSKIY, O. V. and CHEBANENKO, T. M., MEKHAIZATSIIYA I AVTOMATIZATSIIYA UPRAVLENIYA No 2, Mar-Apr 76 p 65

syntax of the language for describing the circuitry of the computer which may be used not only in solving problems of planning the computer but also in the planning of objects which have a topological structure, for example, a telephone network, a network for power supply, etc.

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USSR

GAIBNAZAROV, S. D. and GULYAYEV, V. A.

MACHINE COMPOSITION OF TESTS TO CHECK THE TECHNICAL CONDITION OF COMPUTER UNITS

TOCHNOST' I NADEZHNOST' KIBERN. SISTEM. RESP. MEZHVED. SB. [Precision and Reliability of Cybernetic Systems. Republic Interdepartmental Collection] in Russian No 3, 1975 pp 144-151

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11V859 by the authors]

[Text] A study is made of a machine method of composition of tests to seek out logic defects in standard units of small electronic computers based on Logika-2 elements. 10 References.

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USSR

UDC 62-5:681.3-19

IGNATOV, V. A., YEFIMOV, A. A., PAUK, S. M., CHUPRIN, V. M. and VLASOV, B. B.

DIGITAL-ANALOG INFORMATION-LOGIC MEASUREMENT COMPLEX FOR TECHNICAL DIAGNOSIS OF CONTROL SYSTEMS IN THE DYNAMIC MODE

Kiev POLUCHENIYE I SVOYSTVA TONKIKH PLENOK [Obtaining and Properties of Thin Films] in Russian No 2, 1974 pp 153-154

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G291 by S.R.]

[Text] A description is presented of the peculiarities of a hybrid information-logic measurement complex for ground-based technical diagnosis of on-board automatic pilot equipment in the dynamic mode. A structural diagram of the complex is presented. The functions of the structure of the complex consist of the performance of two main tasks: modeling of the dynamics of trajectory motion of the controlled object together with the on-board control system and calculation, based on the results of modeling, of an integrated quality criterion for the on-board control system being diagnosed. The initial information for modeling of the dynamics of the flight trajectory is information on the position of the control organs of the object in space.  
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USSR

IGNATOV, V. A., YEFIMOV, A. A., PAUK, S. M., CHUPRIN, V. M. and VLASOV, B. B.,  
POLUCHENIYE I SVOYSTVA TONKIKH PLENOK No 2, 1974 pp 153-154

It is indicated that in the complex developed the computer used is Minsk-22, the analog-digital and digital-analog converters are type UP-6, the analog computer is an MN-18. The remaining units in sections of the structural plan of the complex were specially developed due to the lack of series-produced units which were suitable for the purpose. 1 Figure.

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USSR

UDC 681.32

DASHKO, V. YE. and FAYNSHTEYN, I. A.

EVALUATION OF THE EFFECTIVENESS OF USING A CENTRAL PROCESSOR FOR A  
MULTIPROGRAM COMPUTER

Moscow UPR SLOZHN SISTEMAMI [Control of Complex Systems, Collection of Works]  
in Russian, Izd-vo Nauka, 1975 pp 62-66

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNIKA No 5 1976 Abstract No 5B245]

[Text] The authors suggest a method of experimental evaluation of the effectiveness of using a central processor for a multiprogram computer which permits bypassing the computer hardware and software without modification. They examine the realization of the method and the results obtained. Figures 2; References 3. Authors' abstract.

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USSR

UDC 681.32

FAYNSHTEYN, I. A.

EXPERIMENTAL APPROACH TO EVALUATING THE EFFECTIVENESS OF COMPUTER SYSTEMS

Moscow UPR SLOZHN SISTEMAMI [Control of Complex Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 70-74

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNIKA No 5 1976 Abstract No 5B244]

[Text] The author examines an experimental method of evaluating the effectiveness of computer systems and its use in selecting, servicing and investigating the effectiveness of using the computer systems. He gives an analysis of the methods and means of measurements. References 23. Author's abstract.

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USSR

VEDESHENKO, V. A., VOLKOV, A. F., SEMENOV, G. B. and TYURIN, A. V.

ON THE SELF-RESTORATION OF THE EFFICIENCY OF COMPUTER SYSTEMS

Moscow MNOGOPROTSSESSORN VYCHISL SISTEMY [Multiprocessor Computer Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 116-128

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V885]

[Text] The authors examine the features of organization of the self-restoration of the efficiency of computer systems at different levels of the automatic replacement of malfunctioning components. A version of the structural design of computer systems with the self-restoration of efficiency is presented. They have developed logic circuits of hardware diagnostics of malfunctions of restoration blocks and monitoring blocks for this computer system. Authors' abstract.

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USSR

LYSIKOV, V. T., MAMEDLI, E. M. and STARKOV, K. YE.

APPROACH TO EVALUATING THE RELIABILITY OF COMPUTER SYSTEMS

Moscow MNOGOPROTSSESSORN VYCHISL SISTEMY [Multiprocessor Computer Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 132-139

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V883]

[Text] The authors examine the influence of the features of the structures of computer systems and problems to be solved on evaluation of the reliability of achieving the computer process. They show that systems with floating distribution of the problems have an advantage in comparison with systems with strict distribution only in the case where the problems allow pre-servicing. Authors' abstract.

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## HUNGARY

TERPLAN, Kornel, Dr, head system designer, Computer-Technology and Administration Center, MHE [Hungarian Shipping Association]

### COMPUMETRICS. PART 2: SOFTWARE MONITORS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 11 No 2, 76 pp 139-143

[Abstract] Software monitors, which monitor the configuration and the user programs, are used to bring up the actual efficiency of the computer systems to the level of potential efficiency. The software monitors, which are briefly described, perform data acquisition, data processing, and printing. The measurements performed relate to the degree of utilization of the system components. Measurement of the user programs and optimization of the scientific, technical, and data-processing programs is briefly discussed. An analysis was carried out of the various efficiency-improving program packets available in the U.S. More than 95 percent of the 150 widely used packets examined were prepared for IBM configurations. The need for a static measuring program was indicated. Figures 9; references 10: 1 Hungarian and 9 Western.

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USSR

UDC 681.32

LAVRISHCHEV, V. P. and SVIDZINSKIY, K. K.

PROBLEMS IN THE CONSTRUCTION OF ELECTRONIC OPTICAL DIGITAL COMPUTERS AND SYSTEMS

Moscow OPTICH I ELEKTROOPTICH OBRABOTKA INFORM [Optical and Electro-optical Processing of Information, Collection of Works] in Russian 1975, Izd-vo Nauka, pp 52-71

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11 1975 Abstract No 11B156]

[Text] The possible ways for constructing highly productive systems of information processing are analyzed. It is shown that the highest production as compared with third-generation computers may be ensured by optical computer devices using a multichannel coherent optical processing of information in the form of optical images; an optical memory with recording and readout by arrays of  $10^4$ - $10^6$  bits; multielement matrix devices for optical processing which combine the passive optical and active electronic elements. The authors examine and formulate the overall requirements for the element base  
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USSR

LAVRISHCHEV, V. P. and SVIDZINSKIY, K. K., OPTICH I ELEKTROOPTICH OBRABOTKA INFORM 1975, Izd-vo Nauka, pp 52-71

of such systems. They evaluate the limiting possibilities of these systems and show that their limiting productivity is about  $10^{11}$  bits/sec for the information input speed into the optical memory of the system and about  $10^{13}$  bits/sec for an input speed into the optical processor. Figures 3; References 28. Authors' abstract.

USSR

UDC 681.3.01

KHAYKIN, B. YE.

# STRUCTURAL ORGANIZATION OF A TABULAR TYPE OPTICAL COMPUTER

Kiev II VSES KONF PO GOLOGR. TEZISY DOKL. CH I [Second All-Union Conference on Holography. Texts of Reports. Part 1] in Russian 1975 pp 54-55

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B32 by V. A. Nikitov]

[Text] The author examines the structure of a coherent optical computer based on the tabular method of processing information. The features of the problem of creating such a structure are the necessity of developing a method of coding information in coherent light; the method of making the tabular operations on the level both of elementary and of complex operations; the method of processing images and wave fields on the basis of the tabular images and also the use of probability methods of processing information, organization of tabular programming of sequential associative search. The machine includes a multifunctional processor, a block of permanent and operative optical memory, an associative scan device. The authors points out the basic estimates of the structural organization of the tabular type optical machine.

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USSR

UDC 681.327.66

OSTUDIN, V. D. and BOL'SHAKOV, P. P., State Union Construction and Technology Office on Planning of Calculators, Experimental Plant

# STORAGE FOR A PERMANENT MEMORY

AVT SV SSSR [USSR Patent] in Russian, kl G 11 s 17/00, No 465656, Announced 18 Jun 73, Published 14 Aug 75

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B449P]

[Text] Storages for permanent memories which utilize magnetic elements of the type "ring-yoke" as transformers are well known. However, for such storage units it is characteristic to have a small value of the amplitude of the read-out signal with a large (more than 0.5 MHz) frequency of access and a low ratio of amplitude of the signal of the logic unit to the noise amplitude. This latter is due to the fact that the reverse emissions of the voltage of the logic zero signal, coinciding in sign with the signal of the logic unit, may coincide in time because of the scatter in parameters of the elements appearing in the memory.

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USSR

OSTUDIN, V. D. and BOL'SHAKOV, P. P., AVT SV SSSR, k1 G 11 s 17/00,  
No 465656, Announced 18 Jun 73, Published 14 Aug 75

These deficiencies lead to a reduction in noise stability and a complication of the circuits of the information output from the permanent memory and, consequently, to a reduction in the reliability of the device on the whole and to a narrowing of the region of its application. Increase in the noise stability of the device is achieved by introducing into it a short-circuit coil which pierces the zero windows of the magnetic circuits.

2/2

USSR

TSULADZE, M. G.

#### SEVERAL QUESTIONS IN THE ORGANIZATION OF MEMORY ALLOCATION

TR VYCHISL TSENTRA. AN GRUZSSR [Works of the Computer Center, Academy of Sciences, Georgian SSR] in Russian No 2, 1975 pp 200-222

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12, 1975 Abstract No 12V944]

[Text] This work is devoted to questions of the organization of automatic memory allocation in electronic computers. The memory is examined as a unified system consisting of four levels -- P1, P2, P3 and P4. The P levels are distinguished from one another by the speed of reception and transmission of information and the volume which can be placed into the P. There is the possibility of information exchange among the levels. P1 is the operative memory, and P2, P3 and P4 are the external memories of the respective level. When the number of the level is increased the volume is increased and the speed is decreased. The goal is to achieve an allocation of the operative memory P1 and the external memories P2, P3, and P4 such that P1 is used optimally in a certain sense and access to P2, P3, and P4 is reduced to a certain minimum.

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USSR

KORYACHKO, V. P. and KURCHIDIS, V. A.

OPTIMIZATION OF THE ORGANIZATION OF INTERNAL MEMORY OF A DIGITAL CONTROL MACHINE

UPRAVLYAYUSHCHIYE SISTEMY I MASHINY [Control Systems and Machines] in Russian No 3, 1975 pp 87-91

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11V788 by the authors]

[Text] A method is suggested for optimization of the structure of internal memory of a control computer operating in real time in the stage of its algorithmic synthesis. The method is based on the use of equivalent transforms of algorithms performed in the language of straight algorithmic lines.

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USSR

ARLAZAROV, V. L., VARPAKHOVSKIY, A. S., DINITS, YE. A., YEMEL'YANOV, N. YE., FURMAN, M. YE. and CHERNYSHEVA, I. B.

MATHEMATICAL STRUCTURE OF THE MEMORY OF A MULTIPROCESSOR COMPUTER SYSTEM

Moscow MNOGOPROTSSESSORN VYCHISL. SISTEMY [Multiprocessor Computer Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 26-37

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V995]

[Text] The authors examine the principle of organization of a hierarchical memory in a multiprocessor computer system in which all information is presented in the form of arrays. They describe the methods of addressing the arrays and the bases of dynamic distribution and memory protection. References 14. Authors' abstract.

1/1

USSR

VARPAKHOVSKIY, A. S., VOLKOV, A. F., ZENKIN, V. D. and LYSIKOV, V. T.

ON THE ORGANIZATION OF THE MEMORY FOR A MULTIPROCESSOR COMPUTER SYSTEM

Moscow MNOGOPROTSSESSORN VYCHISL SISTEMY [Multiprocessor Computer Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 37-44]

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V992]

[Text] The authors examine a hierarchical memory system with hardware implementation of the information exchange and dynamic memory distribution between processes. They suggest a new principle for organizing the collective utilization of the same data of several interconnected processes via a modular organization of the memory on each of its levels. Authors' abstract.

1/1

USSR

UDC 681.324

BROYTMAN, M. D. and PETERSON, E. YA.

SELECTING OPTIMAL PAGE SIZE IN A MULTIPROGRAM COMPUTING SYSTEM WITH TWO-LEVEL MEMORY

Riga AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, Jul/Aug 76 pp 54-58

[Abstract] In multiprogram computing systems where memory is organized by pages it is important to determine the most efficient page dimensions in order to minimize expenditure of the basic resources of the computing system (time spent by the processor and "time-main memory" products). Formulas are proposed for calculating the relative cost of "spending" the basic resources of a computing system for working out the program. An emulation model of the process of working out the program in a computing system with page-type memory was built to determine expenditures of main memory. The time spent by the processor to work out the program was defined as the sum of actual processing time and processor downtime due to the given program. The

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USSR

BROYTMAN, M. D., and PETERSON, E. YA., AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA  
No 4, Jul/Aug 76 pp 54-58

stationary probability of processor downtime was determined analytically by modeling the computing system under study by the closed network of queueing systems. The curve of total expenditure of basic resources of the computing system which was constructed has a minimum which is reached when the page size is equal to 1,024 four-byte words. There are five illustrations and seven bibliographic entries (two Russian and five Western).

2/2

USSR

BERKOVICH, S. YA., KOCHIN, YU. YA. and USKOV, A. V.

ORGANIZATION OF ASSOCIATIVE ACCESS TO DYNAMIC ARRAYS

Moscow MNOGOPROTSSESSORN VYCHISL. SISTEMY [Multiprocessor Computer Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 110-116

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V994]

[Text] The authors describe the principle of organizing associative access to dynamic information arrays having a multi-level structure. They examine questions involved in the use of the given principles to construct a virtual associative memory using associative memory devices of comparatively small capacity in conjunction with the external memory. They also describe an auxiliary method of using associative memory devices made of three-symbol elements for completing a rapid search of numbers close to a given one. Authors' abstract.

1/1

USSR

GLUKHOV, YU. N. and RYZHKOV, V. V.

ORGANIZATION OF INFORMATION EXCHANGE AT THE LEVEL OF THE OPERATIVE MEMORY  
IN THE M-4000 COMPUTER COMPLEX

TR IN-TA ELEKTRON UPRAVL MASHIN [Works of the Institute of Electronic Control  
Computers] in Russian No 42, 1975 pp 3-13

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V978]

[Text] The authors examine the organization of information exchange in the  
M-4000 computer complex between two groups of devices: the first group  
includes the operative memory device and the memory protection device; the  
second includes the processors and the input-output channels.

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USSR

UDC 681.327.17

SCHIEDEWITZ, WALTER

MEMORY PROTECTION CIRCUIT

PAT GDR [Patent From the German Democratic Republic] in German, kl 42 m<sup>3</sup>  
9/18 (G 06 f 9/18), No 88855, Announced 13 Apr 71, Published 20 Mar 72

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNICA No 11 1975 Abstract No 11B264 P by Yu. Sh.]

[Text] The author has patented a protection circuit for the basic memory of  
a computer designed for multiprogrammed operation. He suggests that the  
basic memory be divided into identical blocks, the addressing of which is  
organized cyclically and to each of which a memory protection key is set  
accordingly. Unlike the familiar types of memory protection keys, these  
are physically made from the same elements as the basic memory (for the  
purpose of reducing the total cost of the memory). The decrease in  
additional costs in total memory access time, which is connected with  
reading of the protection key to the protection keys register from the  
memory of the protection keys, is achieved by a special organization  
of the latter. In each of the memory of the protection keys are stored  
1/2

USSR

SCHIEDEWITZ, WALTER, PAT GDR, kl 42 m<sup>3</sup> 9/18 (G 06 f 9/18), No 88855,  
Announced 13 Apr 71, Published 20 Mar 72

several keys corresponding to several neighboring blocks of the basic memory forming the conditional large block. Here the key belonging to the address block occupies a central position in the cell. Thus, in the volume of the entire memory of the protection keys each key is found to be written multiply. Reading of the necessary protection key in the register of protection keys is not done for each address to the basic memory but only the initial one and also each time when the address of the large block is replaced.

2/2

USSR

UDC 681.3.008

GURVICH, I. S.

#### PROTECTION OF ELECTRONIC COMPUTERS FROM EXTERNAL NOISES

Moscow ZASHCHITA ELEKTRONNYKH VYCHISLITEL'NYKH MASHIN OT VNESHNIKH POMEKH  
[Protection of Electronic Computers From External Noises] in Russian,  
Izd-vo Energiya, 1975, 160 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNIKA No 5 1976 Abstract No 5B206K by M. S. Rusakova]

[Text] The author examines problems arising in the ensurance of electromagnetic compatibility of computers with the external environment. Basic attention is paid to ensuring protection of the computer from impulse and prolonged noises. He systematizes the data on methods and apparatus designed for investigation of external noises and noise protection of the computer. He suggests approximate norms for the necessary degree of computer noise protection. He describes the structural and schematic procedures for increasing noise protection. The book contains six chapters. Chapter 1. Introduction (on the compatability of the computer with the

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USSR

GURVICH, I. S., ZASHCHITA ELEKTRONNYKH VYCHISLITEL'NYKH MASHIN OT VNESHNIKH POMEKH, 1975 160 pp

external environment; electromagnetic compatibility; on the compatibility of the computer with the power supply network; terminology; basic sources and forms of noises).

Chapter 2. Methods and Means of Measuring External Noises (general requirements; measurement of impulse noises by instruments without information storage; measurement of impulse noises with storage or averaging of information; on the planning of instruments for investigating impulse noises in the supply network; features of measuring impulse noises in the supply network; computation of the input filter of high frequencies; measurement of impulse noises in communication lines; measurement of noises from impulse electromagnetic fields; measurement of prolonged noises in the supply network; measurement of harmonic noises).

Chapter 3. Quantitative Values of Noises in Distributional Electrical Networks of Alternating Current (results of narrow-band measurements of impulse noises; results of wide-band measurements of impulse noises; prolonged noises; theoretical distribution of amplitudes of impulse noises).  
2/3

USSR

GURVICH, I. S., ZASHCHITA ELEKTRONNYKH VYCHISLITEL'NYKH MASHIN OT VNESHNIKH POMEKH, 1975 160 pp

Chapter 4. Noise Protection of Computers in a Power Supply Network (impulse noise protection; noise protection with respect to prolonged noises; impulse noise simulators; prolonged noise simulation; several measurement results).

Chapter 5. Normalization of Degree of Noise Protection for the Computer in the Power Supply Network (bases of computing the norms; approximate quantitative values of the norms; monitoring the degree of noise protection).

Chapter 6. Increasing the Noise Protection of the Computer (mechanisms of the effect of impulse noises; recommendations for making external connections; on protective grounding; reduction of the level of impulse noises generated by the computer; mechanisms for the effect of prolonged noises; protection of the computer from prolonged noises; bases of construction of a system of information reduction.

3/3

USSR

UDC 681.327.2

ABRAZHEVICH, R. I., AVER'YANOVA, R. M., ASTSATUROV, R. M., KACHKOV, V. P.,  
MAL'TSEV, N. A., OVSYANNIKOV, V. I. and TIKHOVICH, YU. V.

#### THE YES-1020 COMPUTER INPUT-OUTPUT CHANNELS

Moscow KANALY VVODA-VYVODA EVM YES-1020 [The YeS-1020 Computer Input-Output  
Channels] in Russian, Izd-vo Statistika, 1975 272 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA  
TEKHNICA No 5 1976 abstract No 5B510K by S. G. Romanova]

[Text] The authors discuss the basic principles of organizing the input-  
output for the third-generation computer YeS-1020--one of the models of the  
unified system of computers. They cite the technical characteristics of the  
input-output channels, the structure and composition of the channels and the  
channel control block. Basic attention is paid to a description of the  
principles of controlling the channels and the input-output operations, and  
also the principles of operation of the multiplex and selector channels  
using the microprogram method of control. They examine the structure,  
1/2

USSR

ABRAZHEVICH, R. I., AVER'YANOVA, R. M., ASTSATUROV, R. M., KACHKOV, V. P.,  
MAL'TSEV, N. A., OVSYANNIKOV, V. I. and TIKHOVICH, YU. V., KANALY VVODA-  
VYVODA EVM YES-1020, Izd-vo Statistika, 1975, 272 pp

composition and function characteristics of a standard system of com-  
munication between channels, and external devices -- the input-output  
interface used on all models.

2/2

USSR

TIMOSHCHENKO, V. P.

PROGRAMMING PROCEDURES FOR INPUT-OUTPUT IN THE M5000 PUNCHCARD COMPUTER COMPLEX

Moscow ELEKTRONNO-VYCHISL TEKHN I PROGRAMMIR [Electronic Computer Technology and Programming, Collection of Works] Izd-vo Statistika, No 7, 1975 pp 23-28

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12, 1975 Abstract No 12V1004]

[Text] The author discusses the principles of constructing standard sub-programs (drivers) which control the exchange of information between the operative memory of the computer and the external devices. The M5000 punchcard computer complex belongs to the third-generation small computers. It can be assembled with different volumes of the operative memory (from 16 to 64 Kbytes) and different sets of external devices. The standard service software for the PCC M5000 has a modular structure which makes it possible to generate the operating systems for a given computer depending on its complexity; the modular structure also ensures the possibility of developing these systems in proportion to the degree to which the set of external devices is supplemented.

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USSR

UDC 681.3.06:51

BEZRUKOV, B. A., VINOGRADOV, A. F., YEFIMOVA, A. I., PERVUSHOV, V. I., SAMOYLOV, V. N., STOLYARSKIY, YU. V., KHOROMSKAYA, V. KH., CHULKOV and SHCHELEV, S. A.

BASIC PRINCIPLES OF UTILIZING THE YES-5012 MAGNETIC TAPE STORAGE ON THE SDS-1604A [POSSIBLY CDC-1604A] COMPUTER

Dubna OSNOVNYYE PRINTSIPIY ISPOL'ZOVANIYA NML YES-5012 NA EVM SDS-1604A [Basic Principles of Utilizing the YeS-5012 Magnetic Tape Storage on the SDS-1604A Computer] in Russian, Joint Institute of Nuclear Research. Report 11-9188, 1975 8 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B175K]

[Text] The authors examine the general principles of operating a YeS-5012 magnetic-tape memory on the SDS-1604A type computer in the writing-reproduction format of the YeS computer, using the conversion logic of the 7-track SDS format in a 9-track YeS computer format. Authors' abstract.

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USSR

UDC 681.34

BORZOV, A. F., GOVORUNOV, G. I., LAVRUSHIN, V. I., PROTASOV, V. A., and SHCHERBAKOV, S. I.

A COMPUTER COMPLEX BASED ON THE ANALOG COMPUTER MN-14 AND THE DIGITAL COMPUTER ODRA-1013

Saratov DIFFERENTS. URAVNENIYA I VYCHISL. MAT. [Differential Equations and Computer Mathematics, Collection of Works] in Russian, No 2, Izd-vo Saratov University, 1975 pp 160-172

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMKHKANIKI I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B634]

[Text] The authors examine the technical tools for realizing a complex which includes the analog computer MN-14 and the digital computer Odra-1013. They also examine the requirements for the analog and digital computers in the complex. They describe the formulation of multipoint, boundary value problems on the complex and indicate the operating capabilities of the complex. Figures 12; Tables 2; References 7. Authors' abstract.

1/1

USSR

UDC 681.322

GREBENIKOV, YE. A., DOBROLYUBOV, L. V., IVANOV, V. A., KIOSA, M. N., KOBZAREV, K. K., MIRONOV, S. V. and PRIKHOD'KO, V. A.

DESCRIPTION OF SEVERAL VERSIONS OF MULTIMACHINE COMPUTER COMPLEXES

Moscow OPISANIYE NEKOTORYKH VARIANTOV MUL'TIMASHINNYKH VYCHISLITEL'NYKH KOMPLEKSOV [Description of Several Versions of Multimachine Computer Complexes] in Russian, Institute of Theoretical and Experimental Physics, ITEF-82, 1975, 8 pp, mimeographed

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMKHKANIKI I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B212K]

[Text] The authors describe several versions of multimachine computer complexes based on the idea of combining the computers into a single system. They analyze such complexes, which are capable of multiprogram modes, packet processing and also the time sharing and real time modes of operation. References 8. Authors' abstract.

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USSR

UDC 681.34

KORN, G. and PALUSINSKIY, O.

A CONVENIENT SIMULATION LANGUAGE USABLE IN SOFTWARE FOR ULTRAHIGH SPEED  
HYBRID COMPUTER SYSTEMS

Moscow AVTOMATIKA I TELEMEXHANIKA in Russian No 8, Aug 76 pp 186-199

[Abstract] This article was written by G. A. Korn, University of Arizona, Tucson, Arizona, and by O. A. Palusinski, Gliwice, Polish People's Republic. The article describes the block-diagram-oriented simulation language DARE II. Because the sequence of steps in a digital program being used to solve typical simulation problems on a hybrid computer system is so similar to the stepwise solution of systems of differential equations, well-established languages for modeling continuous systems, especially interactive digital simulation languages such as DARE II, can serve as excellent hybrid computer software with little modification. DARE II can be used to control the ultrahigh speed analog computer LOCUST, yielding an extraordinarily high speed of hybrid computations without sacrificing any simplicity of programming. Examples of iterative optimization, computation of Monte Carlo statistics, and generation of a digital two-variable function in a hybrid computer loop are given.

1/1

USSR

ARLAZAROV, V. L., VOLKOV, A. F., LYSIKOV, V. T. and FARADZHEV, I. A.

ARCHITECTURE OF MULTIPROCESSOR COMPUTER SYSTEMS

Moscow MNOGOPROTSSESSORN VYCHISL SISTEMY [Multiprocessor Computer Systems, Collection of Works] in Russian, Izd-vo Nauka, 1975 pp 12-19

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V886]

[Text] The authors examine the structure of a multiprocessor computer system in which the dynamic distribution of the memory and computer resources is achieved by hardware means. They also review hardware means for raising the efficiency of translation and the computer process. They justify the feasibility of using direct communications and communications through channels. They show the operation of the system. Authors' abstract.

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USSR

MULTIPROCESSOR COMPUTER SYSTEMS

Moscow AN SSSR, M-VO PRIBOROSTR, SREDSTV AVTOMATIZ I SISTEM UPR, SSSR, IN-T PROBL UPR [Academy of Sciences USSR, Ministry of Instrument Construction, Means of Automation and Control Systems USSR, Institute of Control Problems in Russian, Izd-vo Nauka, 1975, 143 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12V873]

[Text] This collection is devoted to the software and hardware of multiprocessor systems, the organization of the computational process, and dynamic distribution of the memory and computer resources. Annotation.

1/1

USSR

VAL'KOVSKIY, V. A.

METHOD OF LOADING OF SEVERAL PROCESSORS WITH ONE PROBLEM

Novosibirsk SISTEM. I TEOR. PROGRAMMIR. [Systems and Theoretical Programming] in Russian 1974 pp 116-129

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11V849 by V. Ostroyskiy]

[Text] In the traditional approach to the problem of dynamic distribution, it is usually assumed that each processor has an individual turn. Dispatching in this case is reduced to location of operators ready for performance and their distribution among processors so that the realization of the program occupies the minimum time. This article studies a hypothetical machine with a turn or succession common to all processors. The duties of the dispatcher include only determination of those ready for work. From the theoretical standpoint, this distribution can be looked upon as desequencing by a zonal method with analysis depth equal to the first conditional operator not yet run. It is assumed that the method is run on a computer with  $n > 1$  processors, operating with common main and accessory memory with a volume such that it is sufficient to store any linear section of a program. This method of dynamic distribution is quite economical in programs with high local

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USSR

VAL'KOVSKIY, V. A., SISTEM. I TEOR. PROGRAMMIR 1974 pp 116-129

parallelism factor. With some modernization, the method could be formulated for the case of specialized processors as well.

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USSR

UDC 681.3.01

KORYAKO, V. P., OREKHOV, V. V. and UTENKOV, V. G.

OPTIMIZATION OF THE STRUCTURE OF A DECENTRALIZED MULTIPROCESSOR INFORMATION SYSTEM

Ryazan' TR RYAZAN RADIOTEKHN IN-TA [Works of Ryazan' Radio Engineering Institute] in Russian, No 63, 1975 pp 91-95

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B35]

[Text] The authors examine the problem of optimization of the structure of a decentralized multiprocessor system, built from a set of processors (both like and different processors being allowed), operating autonomously in real time in the information system. The criterion of optimality is the requirement of minimization of the maximally possible time for finding the messages-orders in the system. Authors' abstract.

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USSR

UDC 681.325...22

POTASHNIK, V. YA., Candidate of Technical Sciences and DYLEVOY, S. T.,  
engineer

SOFTWARE FOR THE DIALOG MODE OF PERIPHERAL COMPUTERS OF A COMPUTER SYSTEM

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 2, Mar-Apr  
76 pp 69-73 manuscript received 1 Jul 75

[Abstract] The authors are concerned with the development of automated, information scanning, control and other systems wherein it is necessary to have operative access for a significant number of users to the system directly from their own locations through terminal devices. The setup described here is used for the Minsk-22 computer; however it may be used for practically any second-generation computer since it permits more effective utilization of them at the lower level of the hierarchy in multi-machine operative systems. Thus, the other more highly productive machines of the system are not loaded down with operations of data exchange with slow-response external devices. Figures 3; References 2: 2 Russian.

1/1

USSR

POTTOSIN, I. V.

STRUCTURE OF COLLECTIVE USE OPERATING SYSTEMS

Novosibirsk NEKOTOR. PROBL. VYCHISL. I PRIKL. MAT. [Some Problems of Computer Mathematics and Applied Mathematics] in Russian, "Nauka," 1975 pp 205-257

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11V862 by the author]

[Text] A structure is suggested for an operating system for collective use, consisting of three levels: problems, systems and core levels. The functional difference in the levels is indicated and components of the problems and systems levels presented. 11 References.

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USSR

UDC 681.3.001:518.5

IVANOV, V. A., PALAGIN, A. V., and SYROV, V. V.

DYNAMIC MICROPROGRAMMING. PRINCIPLES OF STRUCTURAL ORGANIZATION  
AND ANALYSIS OF EFFECTIVENESS

UPRAVLYAYUSHCHIYE SISTEMY I MASHINY [Control Systems and Machines]  
in Russian No 6, 1975 pp 57-63

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLI-  
TEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B137]

[Text] The authors examine the principles of realizing dynamic  
microprogramming in modern computers. They give a classification  
of the procedure of dynamic microprogramming of control as a func-  
tion of the type of microprogram memory and means of rewriting the  
control information. They evaluate the effectiveness of the dy-  
namic microprogramming for different algorithms of rewriting. Fig-  
ures 2; references 14. Authors' abstract.

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USSR

FILINOV, YE. N.

ORGANIZATION OF COMPLEX PROGRAM SYSTEMS ON THIRD-GENERATION MACH-  
INES

TR IN-TA ELEKTRON UPRAVL MASHIN [Works of the Institute of Elec-  
tronic Control Computers] in Russian, No 42, 1975 pp 55-57

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12, 1975 Abstract No  
12V935]

[Text] None.

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USSR

UDC 81.3.06:51

MUZYLEV, V. V. and SHIPILOVA, V. I.

SYSTEM OF AUTOMATIC JOINING OF PROGRAMS ON A TYPE M-20 COMPUTER

NAUCH INFORM. ASTRON SOVET AN SSSR [Scientific Information, Council on Astronomy of the USSR Academy of Sciences, No 34, 1974 pp 29-44

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11 1975 Abstract No 11B91]

[Text] The authors propose a system (the KM-alpha complexer) which permits one to easily create complexes from autonomously translated programs on a computer with the M-20 command system. The system is oriented to programs of the alpha-translator but can be used also in working with other translators or code programs. Use of the KM-alpha complexer gives a significant savings in the computer's operative memory. Authors' abstract.

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USSR

UDC 681.321

BAYKOV, V. D., PLOTNIKOV, A. V. and PIKULIN, V. V.

ELECTRONIC KEYBOARD COMPUTERS

Penza VYCHISL TEKHNIKA [Computer Technology, Collection of Works] in Russian No 4, 1975 pp 155-162

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 11 1975 Abstract No 11B417]

[Text] The authors examine the structural and functional features, the parameters and requirements imposed on electronic keyboard computers. On the basis of a survey of existing models, they classify the keyboard computers as a function of the composition of operations, the element base, and the information output devices. They show that in the case of using the "digit-by-digit" method for computing the elementary functions, the possibility for utilizing a binary system of computing in the keyboard computers arises. They give the algorithms for transforming the binary-decimal code into a binary one and the binary code into a binary-decimal one. Figures 2; References 16. Authors' abstract.

1/1

USSR

VAYKOV, V. D., PLOTNIKOV, A. V. and PIKULIN, V. V.

ELECTRONIC KEYBOARD COMPUTERS

Penza VYCHISL. TEKHNKA [Computer Technology. Collection of Works] in Russian  
No 4, 1975 pp 155-162

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11V716 by  
the authors]

[Text] A study is made of the design and functional peculiarities, parameters and requirements placed on keyboard computers. Based on a review of existing models, keyboard computers are classified as a function of the composition of operations, element basis, and information output devices. It is shown that when the "number-by-number" method is used to calculate elementary functions, the possibility of using binary notation in keyboard computers occurs. Algorithms are presented for conversion of binary-decimal code to binary and binary code to binary-decimal code. 16 References.

1/1

VIII. GENERAL INFORMATION  
A. Conferences

USSR

CONFERENCE ON COMPUTER MEMORY

Tbilisi ZARYA VOSTOKA in Russian ("Scientific-Technical Conference")  
16 Sep 76 p 2

[Text] The problems involved in perfecting computer memories are being discussed at the All-Union Scientific-Technical Conference which opened on 13 September in Tbilisi. It was organized by the Central and Georgian Republic Boards of Directors of the Scientific-Technical Society for Radio Engineering and Communications imeni A. S. Popov, a number of union and republic ministries, and the Institute of Cybernetics of the Academy of Sciences Georgian SSR. In addition to Soviet scientists and specialists, guests representing a number of scientific centers in Bulgaria, Hungary, the GDR, Poland, and Czechoslovakia are also participating in the conference.

"The solution to the problems involved in perfecting and creating theoretically new memory devices for computers is one of the main goals of specialists in the field of computer technology during the 10th five-year plan," said Prof L. Krayzmer, chairman of the conference's organizing committee, to a GruzINFORM correspondent [expansion unknown]. "The volume and speed of computer memories determine the productivity of these electronic mathematicians."

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USSR

ZARYA VOSTOKA 16 Sep 76 p 2

Devices have been developed which make it possible to record and store in a computer memory up to hundreds of units of information (bits) on one millimeter of magnetic tape, up to a thousand bits on a semiconductor crystal with an area of several square millimeters, and up to tens of thousands of bits on a square millimeter of the surface of optic and holographic storage devices.

Together with their colleagues from the socialist countries, Soviet specialists have created memory devices with improved parameters and several theoretically new computer memory devices.

2/2

USSR

MAMEDOV, SH.

COMPUTER USERS' SEMINAR HELD IN BAKU

Baku BAKINSKIY RABOCHIY in Russian ("A Full Load for Computers") 11 Sep 76  
p 2

[Text] A City Seminar on Software and Technical Exploitation of New-Generation Electronic Computers (YeS-EVM) took place yesterday in the assembly hall of Azerbaydzhan State University imeni S. M. Kirov.

The organizers of the seminar were the republic affiliate of the All-Union Association of Computer Users and the Baku Specialized Territorial Administration of SOYUZEVMKOMPLEKS [expansion unknown].

I. Novruzbekov, chairman of the republic affiliate of the All-Union Association, R. Makhmudzade, director for software, O. Melikov, a representative of the Specialized Territorial Administration, and others presented papers at the seminar.  
1/2

USSR

MAMEDOV, SH., BAKINSKIY RABOCHIY 11 Sep 76 p 2

Approximately 150 computer users--representatives of scientific research institutes, higher educational institutions, associations, and enterprises--carried on a broad exchange of experience on the operation of new computers.



USSR

ALEKSANDROV, A., Voroshilovgradskaya Oblast'

COMPUTER CONFERENCE HELD IN SEVERODONETSK, HOME OF M-6000 AND M-7000

Kiev PRAVDA UKRAINY in Russian ("Computer Creators Take Counsel") 19 Sep 76  
p 2

[Text] The M-6000 and M-7000 computer complexes, which were created by the Severodonetsk Scientific-Industrial Association "Impul's," are finding ever greater applications in the national economy. They are playing an important role in the control of technological processes and are being used in the automated control systems of numerous enterprises and sectors of industry.

The problems of further development of computer complexes and their application to automated control systems were discussed recently at an all-union scientific-technical conference in Severodonetsk. Some 600 specialists from more than 100 cities of our country participated in the conference.

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USSR

SYMPOSIUM ON PROCESS-CONTROL SOFTWARE

Tallin SOVETSKAYA ESTONIYA in Russian ("Mathematics and Production")  
4 Jun 76 p 3

[Text] The 1970's are seeing rapid movement of control computers into the most diverse spheres of human activity. One of them is production, in particular, technological processes occurring in real time.

"In such complex chemical processes as, say, the production of mineral fertilizers, there will often be just thousandths of a second to make decisions on optimization of the process. A human being cannot do this, but a machine, if it has sufficient data and an algorithm, that is to say a program of the process, can," B. Tamm, director of the Institute of Cybernetics of the Academy of Sciences Estonian SSR, told our ETA [Estonian News Agency] correspondent. "Thus it has been clear to mathematicians for several years that there must be special review of process control software, which differs from the classical programs for general-purpose computers. The first international symposium on software for process control, held in Tallin, was devoted to this subject.

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USSR

SOVETSKAYA ESTONIYA 4 Jun 76 p 3

The symposium was organized by the USSR National Committee on Automatic Control, the Institute of Control Problems of the Academy of Sciences USSR (AN SSSR), and the Institute of Cybernetics of the AN SSSR. The symposium was held under the aegis of the International Federation on Automatic Control (IFAC) and the Technical Committee for Applications of the International Federation for Information Processing (IFIP). Scientists and specialists from 16 countries participated in the symposium.

"The symposium confirmed," said B. Tamm, who was chairman of the organizing committee, "that computer technology, in the form of microprocessors and minicomputers, is moving more and more intensively and efficiently into the area of controlling various industrial, transport, administrative, and other processes.

"We consider the placement of the symposium in Tallin as recognition of the lengthy work of the Institute of Cybernetics of the Academy of Sciences Estonian SSR on questions of software for process control."

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USSR

SERGUN'KIN, N.

MIR-3 DISPLAYED AT EXHIBIT ON EFFECTIVE MANAGEMENT

Moscow EKONOMICHESKAYA GAZETA in Russian ("For Effective Management")  
No 36, Sep 76 p 24

[Excerpts] As has already been reported in Ekonomicheskaya Gazeta, an inter-industry thematic exhibit called "For Effective Management" has opened at the VDNKh SSSR [Exhibition of Achievements of the National Economy USSR]. Approximately 200 enterprises and organizations are represented in the 11 subdivisions of the exhibit, which reflect improvements made by various sectors of industry in planning, economic stimulation, organization of management, accounting and statistics, pricing, material-technical supply, and worker participation in management.

Visitors to the exhibit have an opportunity to familiarize themselves with the activities of numerous industrial and scientific-industrial associations, including the "Tsentrprogrammsistem" Scientific-Industrial Association, which was established to provide programs for automated management systems [ASU's] to sectors of industry, associations, enterprises, and organization throughout the Soviet Union.

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USSR

SERGUN'KIN, N., EKONOMICHESKAYA GAZETA No 36, Sep 76 p 24

The exhibit also affords an opportunity to become acquainted with the various aspects of the development, creation, and functioning of ASU's of different levels. For example, there are now approximately 790 automated process control systems [ASUTP's] operating in enterprises. They control numerous technological processes in the metallurgical and chemical industries and in other branches of heavy industry. In recent years, ASUTP's have begun to be established in sectors of the food and milk-and-meat industries.

A photograph accompanying the original article [not reproduced] shows "visitors becoming acquainted with a new computer, the Mir-3."

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USSR

UDC 62-52:007.5

Unsigned

THIRD ALL-UNION INTER-VUZ SCIENTIFIC AND TECHNICAL CONFERENCE ON "ACHIEVEMENTS AND PROSPECTS FOR THE DEVELOPMENT OF TECHNICAL CYBERNETICS." ABSTRACTS OF REPORTS. SECTION 3. AUTOMATED CONTROL SYSTEMS FOR TECHNOLOGICAL PROCESSES

Kiev III VSESOYUZNAYA MEZHVUZOVSKAYA NAUCHNOTEKHNICHESKAYA KONFERENTSIYA "DOSTIZHENIYA I PERSPEKTIVY RAZVITIYA TEKHNIЧЕСKОY KIBERNETIKI." TEZISY DOKL. SEKTS. 3. AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA TEKHNOLOGICHESKIMI PROTSESSAMI in Russian, Ministry of Higher and Secondary Specialized Education USSR, Ministry of Higher and Secondary Specialized Education Ukrainian SSR, Scientific Research Institute of Scientific-Technical Information and Technical-Economic REsearch of Gosplan Ukrainian SSR, 1975 112 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G657K by V. G.]

[Text] The works of this collection study theoretical and practical problems in the functioning of automatic technological process control systems [ASU TP]. The collection contains 32 works, including: the status and prospects for the development of ASU TP, the solution of the problem of optimization in

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USSR

III VSESOYUZNAYA MEZHVUZOVSKAYA NAUCHNOTEKHNICHESKAYA KONFERENTSIYA  
"DOSTIZHENIYA I PERSPEKTIVY RAZVITIYA TEKHNICHESKOY KIBERNETIKI." TEZISY  
DOKL. SEKTS. 3. AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA TEKHNOLOGICHESKIMI  
PROTSESSAMI 1975 112 pp

automatic technological planning systems for chemical production processes, search-free automatic optimization of the structure of complex systems for regulation of production processes, the use of relay modeling functions for testing and identification of dynamic objects with an unknown scale of time, method of determination of deviation from an extreme based on a regulating effect using a supplementary model, structural identification in the frequency area of unstable objects with distributed parameters, identification of the parameters of linear control objects with imprecise knowledge of the initial data. Descriptions are presented of the identification of multidimensional control objects, a structural optimization system for chemical technology systems, a study of the effectiveness of control and organization of the technological process at elevators by imitation modeling, mathematical modeling and organization of a model experiment in a study of the effectiveness of complex control systems by statistical-probability methods, the statistical approach to the construction of algorithms for integrated control systems for continuous production processes, the task of identification  
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III VSESOYUZNAYA MEZHVUZOVSKAYA NAUCHNOTEKHNICHESKAYA KONFERENTSIYA  
"DOSTIZHENIYA I PERSPEKTIVY RAZVITIYA TEKHNICHESKOY KIBERNETIKI." TEZISY  
DOKL. SEKTS. 3. AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA TEKHNOLOGICHESKIMI  
PROTSESSAMI 1975 112 pp

in the construction of the mathematical model of an ammonia synthesis column, algorithmic support for the problem of identification and control for ASU TP in electric vacuum production. A mathematical approach is given to the synthesis of the algorithms for a ASU TP, as well as a set of formulas for integration of the control system for a shop, automatic processing of experimental data in the investigation of the composition and properties of mixtures, the problem of distribution of loads in the ASU of a continuous technological process. Descriptions are presented of machine planning of ASU TP, a study of the processes of construction of computer-based control systems for accelerators, prediction of the strength state of rubber belts, computer investigation of the dynamic modes of independent electric power systems, coordination of linear subsystems in multilevel hierarchical structures for optimization of complex technological processes, diagnostic algorithms for the ASU of a shop, control of chemical and technological processes using adaptation principles. A study is made of a control system  
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III VSESOYUZNAYA MEZHVUZOVSKAYA NAUCHNOTEKHNICHESKAYA KONFERENTSIYA "DOSTI-ZHENIYA I PERSPEKTIVY RAZIVIYA TEKHNICHESKOY KIBERNETIKI." TEZISY DOKL. SEKTS. 3. AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA TEKHNOLOGICHESKIMI PROTSSESSAMI, 1975 112 pp

for the operation of track machinery using magnetic recording of code on the rails, the introduction of time redundancy to a memory unit based on a correcting code, a model and optimization of a multifactor continuous technological chemical process, an algorithm for calculation of partially optimal modes of single-ingot and two-ingot rolling in reducing mills, selection of parameters for a space-time queueing system, identification of an industrial reactor with internal circulation, investigation of the dynamics of a complex chemical technology process.

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USSR

#### COMPUTER CONFERENCES ANNOUNCED

Moscow VESTNIK AKADEMII NAUK SSSR in Russian ("Calendar of Scientific Meetings") No 8, 1976 pp 139-142

[Abstract] A list of upcoming scientific conferences and symposia includes two on computer technology. The Fifth Conference on Monte Carlo Methods in Computer Mathematics and Mathematical Physics will be held for three days in October in Novosibirsk by the Computer Center of the Siberian Department of the Academy of Sciences USSR (located at 630090 Novosibirsk, prosp. Nauki, 6; telephone 65-54-67) [6 Science Prospect, Novosibirsk 630090]. The Sixth Conference on the Operation of the BESM-6 Computer will be held in Tbilisi in October for three days. It is being sponsored by the Computer Center (117333 Moskva, ul. Vavilova, 40; telephone 135-20-79) [40 Vavilov St., Moscow 117333], the Institute of Applied Mathematics of the Academy of Sciences USSR, and Tbilisi University.

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USSR

YURCHENKO, I.

TBILISI CONFERENCE ON ARTIFICIAL INTELLIGENCE

Moscow SOVETSKAYA ROSSIYA in Russian ("Terrestrial Brothers of the Lunar Rover") 16 Sep 76 p 4

[Abstract] The Institute of Cybernetics of the Academy of Sciences Ukrainian SSR has created an ordinary looking hand cart that can move autonomously over rugged terrain, bypassing ruts and prominences and pausing before steep ascents as if to consider if it can make it up the slope. It differs from lunar rovers, however, in that it does not require radio signals to control it. It is based on the research of a Soviet physiologist, Academician N. M. Amosov. A film of the hand cart in operation was shown at an international conference on artificial intelligence held in Tbilisi. Other electronic creations were also demonstrated at the conference.

Commenting on these inventions of cybernetics, Candidate of Technical Sciences Ye. Aleksandrov, a participant in the Tbilisi conference, emphasized, "The important feature of these devices is their autonomy. The expediency and single-mindedness of their actions is not based on an earlier foreseen and calculated solution, but precisely on an independent  
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USSR

YURCHENKO, I., SOVETSKAYA ROSSIYA 16 Sep 76 p 4

choice of a path to a goal. It goes without saying, they can fulfill only the most simple, elementary intellectual operations, and we will not demand greater things from them for the time being. They are, after all, children..."

USSR

CHESANOVA, T.

MANAGING THE "INFORMATION EXPLOSION"

Leningrad LENINGRADSKAYA PRAVDA in Russian 16 Jun 76 p 2

[Abstract] Yu. P. Kulikovskiy, Doctor of Technical Sciences, rector of the Electrotechnical Institute of Communications imeni Bonch-Bruyevich, and chairman of the organizational committee of the 4th International Symposium on Information, discussed matters of interest to participants of the symposium which opened 15 June 1976 at Leningrad.

He discussed mathematical problems of information theory, including the development of codes, the transmission of information in code across vast distances, codes which correct themselves (or signal permissible errors), and problems of coordination of communication channels and sources of communications.

He emphasized that the symposium does not touch upon any kind of engineering problems but only considerations of the most recent achievements of theoretical thought related to the reception, processing, and transmission of information.

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## B. Organizations

USSR

### Photo Caption

Moscow IZVESTIYA in Russian 8 Oct 76 p 2

[Text] The first stage of an information-computer center for an automated management system has begun to operate at the Bratsk Aluminum Plant.

In the photo: engineers A. Bryzgalova, N. Kotova, and A. Dolgikh in the computer center.





USSR

LITVINENKO, L. M., head of the Donetsk Scientific Center of the Academy of Sciences Ukrainian SSR, academician of the Academy of Sciences Ukrainian SSR

CYBERNETICS RESEARCH AT THE DONETSK SCIENTIFIC CENTER

Kiev VISNIK AKADEMII NAUK UKRAINS'KOI RSR in Ukrainian ("Academy of Sciences of the Donbass") No 2, 1976 pp 15-22

[Abstract] On the eve of the 25th Party Congress, the Donetsk Scientific Center of the Academy of Sciences Ukrainian SSR is celebrating its 10th anniversary. Ten years is not a long time, but already the center boasts 11 academic institutes in which over 600 scientific workers and over 200 doctors and candidates of sciences are working. The staff also includes 5 academicians and 13 corresponding members of the Ukrainian Academy of Sciences.

As we enter the period of the 10th five-year plan, the Institute of Applied Mathematics and Mechanics is intensifying its scientific activity and its links with specific objects of the national economy. One of the fields in which it will concentrate its main efforts is the use of cybernetics and computer mathematics to solve multi-level process control problems in metallurgy. The institute has prepared concrete proposals regarding a  
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LITVINENKO, L. M., VISNIK AKADEMII NAUK UKRAINS'KOI RSR No 2, 1976 pp 15-22

software system and an analysis of models of information flows (the "Dokument" system), which can be used by any type of industrial enterprise or institute for the planning stage of an automated control system. The institute has also introduced the "List" system, an automated system for operational planning and control of sheet rolling production, which should prove useful in ferrous metallurgy.

The Institute of Industrial Economics has designed automated control system complexes and put them into operation at the Bryanskiy, Gorlovskiy and Druzhkovskiy Machine-Building Plants, "Azovstal'" [Azov Metallurgical Plant], and the "Donbasenergobudindustriya" [expansion unknown] Association. It has participated in the development of subsystems for optimal planning of gas flows in the main gas pipelines of the country, as well as separate subsystems for the "Ukrchormet" [Ukrainian ferrous metallurgy] automated control system and the sector-wide automated control system for the Ministry of the Chemical Industry Ukrainian SSR.

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## HUNGARY

### Working Committee announcement

#### ESTABLISHMENT OF A WORKING COMMITTEE ON THE APPLICATIONS OF MICROPROCESSORS

Budapest MERES ES AUTOMATIKA in Hungarian Vol 24 No 6, 1976 pp 226-227

[Text] The use of microprocessors and their associated LSI circuits has already been started in Hungary. Although still in the beginning stages, this development affects significantly some major areas of industry, research, education, and the like. Our experts recognize in more and more institutions this significance, and the building of the foundations and the creation of the application conditions has already started in a number of institutions, although more or less independently of each other.

At the same time, the experts feel more and more the need for a forum dealing with the applications of microprocessors, where the current and prospective specialists in the field can establish direct relationships among each other, outside of the governmental and institutional framework. This need has been

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## HUNGARY

MERES ES AUTOMATIKA Vol 24 No 6, 1976 pp 226-227

quite well demonstrated by the attendance at the lecture series on microprocessors sponsored jointly by the Scientific Association of Communication Engineering and the Scientific Association for Metrology and Automation. The participants were very active at these lectures. The Executive Committee of the Scientific Association of Communication Engineering accepted the proposal made by the experts to establish a "Working Committee on the Applications of Microprocessors" with the modification that the three relevant organizations are also included in the new committee by inviting the Scientific Association for Metrology and Automation and the Neumann Janos Computer-Science Society. All three associations have already cooperated in the past. The joint working committee appeals to the experts who are interested to participate in the first club day of the users, where the format, framework, and themes will be established on the basis of ideas and suggestions from the participants. Initially, we think of possibilities such as invitation of domestic and foreign speakers and the presentation of domestic achievements, and exchange of opinions in a well-defined application area or in connection with a processor type. We are

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MERES ES AUTOMATIKA Vol 24 No 6, 1976 pp 226-227

also planning to set down the conditions for the application of microprocessors, to discuss university training in the field of microprocessors, and the like.

We ask those who are interested to send in their names, addresses, and field of interest as soon as possible by writing to the Secretariat of the Scientific Association of Metrology and Automation (1372 Budapest V, Kossuth Lajos Square 6-8, III. 318) to permit us to compile the invitation list for the club day.

### Working Committee on the Applications of Microprocessors

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## YUGOSLAVIA

INSTITUTE FOR AUTOMATIC CONTROL AND COMPUTER SCIENCE (IRCA) OF THE ENERGAINVEST FIRM

Zagreb AUTOMATIKA in Serbo-Croatian No 5-6, 1975 pp 171-172

[Text] The IRCA's Background

IRCA--the Institute for Automatic Control and Computer Science--is a basic organization of associated labor that is part of the Energoinvest business firm and is registered as a scientific institution.

### 1. IRCA's Function

IRCA was set up in 1964 in order to develop techniques for automatic control of technical and technical-and-economic facilities and systems which the Energoinvest firm builds as the holder of the engineering contract. Since production and design are dependent on the performance of this task, the IRCA is a link in the unbroken development-production-design chain made up by the basic organizations of associated labor in Energoinvest's Control Installations Sector.

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## YUGOSLAVIA

AUTOMATIKA No 5-6, 1975 pp 171-172

### 2. What Does IRCA Do--In Terms of Type of Work?

The types of work which are IRCA's task are as follows:

- a. development of new products from the idea to manufacture of the industrial prototype, the testing of the industrial prototype, and preparation of new documentation for the production,
- b. development of standard design for a new product's use in complex automatic control systems,
- c. preparation of the entire commercial-and-technical documentation for a new product as required by the sales staff.
- d. preparation of operating instructions and information on a new product which accompanies the product and which the customer uses so as to properly operate the product and maintain its functionality during its operation in the facility,
- e. nonstandard design in automatic control techniques either for the engineering office of Energoinvest's Control Installations Sector or for the customer directly,

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## YUGOSLAVIA

AUTOMATIKA No 5-6, 1975 pp 171-172

- f. thorough analysis of facilities for purposes of the description required for adoption of higher levels of control, including computer control of technological processes and power systems,
- g. compiling of computer programs for computer process control at the level of information systems, process monitoring, or optimalization,
- h. identification of the state of the facility being controlled and preparation of recommendations to improve and raise the efficiency of the processes by rebuilding computer hardware,
- i. preparation of investment programs in the field of automation of processes and systems.

### 3. What Does IRCA Do--In Terms of Technological Fields?

The categories of the principal types of work described under Point 2 fall in the following technical fields:

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## YUGOSLAVIA

AUTOMATIKA No 5-6, 1975 pp 171-172

- a. technological process control,
- b. application of digital computers to process and system control,
- c. control and protection of electric power systems.

In order to perform all the types of work in these technical fields IRCA has laboratories in departments furnished with the most up-to-date measuring equipment, the most important of them being the following:

- a. department for telemetry and signal processing,
- b. department for computer engineering,
- c. department for technological process control,
- d. department for automatic control and protection of transformer substations,
- e. department for control of operations based on electric motors.

### 4. Personnel

At the beginning of 1976 IRCA had a total staff of 180, 100 of whom are graduate engineers, including 3 doctors of engineering sciences, 10 masters of engineering sciences, 2 university professors, numerous assistants,  
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AUTOMATIKA No 5-6, 1975 pp 171-172

and about 40 staff members engaged in postgraduate studies in Yugoslavia and abroad. Currently 120 students are studying in departments of automatic control, electronics, computer science and mechanical engineering on IRCA scholarships.

### 5. Gross Income and Other Indicators

IRCA sells the results of its research and development as its product in the form of documentation, studies and know-how in Yugoslavia and abroad, and the makeup of its clientele is as follows:

Production, engineering and design organizations of Energoinvest	40 percent
Bosnia-Herzegovina Republic Community for Scientific Research	4 percent
Scientific research for foreign customers	25 percent
Services to other organizations in Yugoslavia	31 percent

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YUGOSLAVIA

AUTOMATIKA No 5-6, 1975 pp 171-172

IRCA's gross income in recent years has been as follows, in millions of old dinars:

1970	300	1973	1,200
1971	500	1974	1,480
1972	900	1975	2,800
		1976 according to the plan	4,600

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## C. Personalities

USSR

MINISTRY OF INSTRUMENT BUILDING, MEANS OF AUTOMATION AND CONTROL SYSTEMS USSR, CENTRAL BOARD OF DIRECTORS OF THE SCIENTIFIC-TECHNICAL SOCIETY OF THE INSTRUMENT BUILDING INDUSTRY IMENI ACADEMICIAN S. I. VAVILOV, AND THE EDITORIAL BOARD AND EDITORS OF THE JOURNAL PRIBORY I SISTEMY UPRAVLENIYA

V. A. TRAPEZNIKOV CELEBRATES 70TH BIRTHDAY

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian ("We Congratulate You on Your Jubilee") No 1, 1976 p 16

[Abstract] Doctor of Technical Sciences Vadim Aleksandrovich Trapeznikov, the most outstanding Soviet scientist and organizer in the field of automation and control theory, has celebrated his 70th birthday. Since 1951, Vadim Aleksandrovich has held the post of director of the Institute of Control Problems (formerly the Institute of Automation and Telemechanics) and has been responsible for establishing the present atmosphere of creativity and goodwill among the staff. Under his direction, the institute has become a major scientific center with a world-wide reputation in a broad range of topics in the control of technical, economic, and organizational systems, including both fundamental theory and practical applications. In recent years Vadim Aleksandrovich has also headed the Chair of Control Problems at Moscow State University and the Chair of Control Problems at Moscow Physico-Technical Institute.

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PRIBORY I SISTEMY UPRAVLENIYA No 1, 1976 p 16

Academician Trapeznikov is also the author of numerous scientific works, editor-in-chief of the journal Avtomatika i Telemekhanika [Automation and Telemechanics], and editor of a four-volume encyclopedia Avtomatizatsiya Proizvodstva i Promyshlennaya Elektronika [Automation of Production and Industrial Electronics]. He has been repeatedly elected to the executive committee of IFAC [International Federation on Automatic Control] and is an honorary member of the Hungarian and Czechoslovakian Academies of Sciences. He has been an Active Member of the Academy of Sciences USSR since 1960.

Vadim Aleksandrovich is the recipient of the title Hero of Socialist Labor (1965), two Orders of Labor Red Banner, numerous government medals, and medals from the Academy of Sciences USSR. He was a delegate to the XXIII Party Congress and has been frequently elected a member of his institute's party bureau.

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#### D. Publications

USSR

UDC 621.398

KALASHNIKOV, I. D., STEPANOV, V. S. and CHURKIN, A. V.

##### ADAPTIVE SYSTEMS FOR COLLECTION AND TRANSMISSION OF INFORMATION

Kiev MEKHAIZATSIIYA I AVTOMATIZATSIIYA UPRAVLENIYA in Russian ("New Books")  
No 2, Mar-Apr 76 p 77

[Review of book Adaptivnyye Sistemy Sбора i Peredachi Informatsii [Adaptive Systems for Collection and Transmission of Information] by I. D. Kalashnikov, V. S. Stepanov, and A. V. Churkin, Moscow, "Energiya" Publishing House, 1975, 240 pp]

[Text] This book is devoted to investigation of the principles of constructing adaptive systems of collection and transmission of information capable of automatically redistributing their own carrying capacity between individual sources of information by allowing for their current information activity and value of the messages to be processed. The authors examine questions of transmitting random flows of messages along a synchronous communication channel. They investigate the basic sources of errors in information transmission and optimize the parameters of various versions of adaptive systems of information collection and transmission. The book is intended for technicians working in the field of planning telemetry information systems.

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USSR

UDC 681.322

SERGIYENKO, I. V., PARASYUK, I. N. and TUKALEVSKAYA, N. I.

##### AUTOMATED DATA PROCESSING SYSTEMS

Kiev MEKHAIZATSIIYA I AVTOMATIZATSIIYA UPRAVLENIYA in Russian ("New Books")  
No 2, Mar 76 p 77

[Review of book Avtomatizirovannyye Sistemy Obrabotki Danykh [Automated Data Processing Systems] by I. V. Sergiyenko, I. N. Parasyuk, and N. I. Tukalevskaya, Ukrainian SSR. Institute of Cybernetics)]

[Text] The authors examine questions of developing, constructing and investigating the software of automated data processing systems on a computer and several problems which arise here. The most interesting stages of realizing systems of data processing on a computer are examined using an example of the developed USOD [expansion unknown] system. The book is intended for the scientific staffs and engineers occupied with the theory and practice of data processing systems and automated control systems.

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USSR

UDC 62-52:007.5

LIPAYEV, V. V. and YASHKOV, S. F.

EFFECTIVENESS OF METHODS OF ORGANIZATION OF THE COMPUTATIONAL PROCESS IN  
AUTOMATED MANAGEMENT SYSTEMS

Moscow EFTEKTIVNOST' METODOV ORGANIZATSII VYCHISLITEL'NOGO PROTSESSA V  
ASU in Russian, "Statistika," 1975 256 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G662K by  
V. G.]

[Text] A study is made of the problem of effective utilization of computer resources available in control computers operating in real time. The basic characteristics of various methods (M) of organization of the computational process (CP) are presented. The effectiveness of complex and improved methods of organization of CP is compared with simple methods, taking into consideration the cost of the computational resources of the computer needed to implement them. Recommendations are presented for the application of various M and disciplines of CP organization and principles of estimation of their effectiveness. The book contains the following chapters: peculiarities of the organization and principles of estimation of the effectiveness  
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USSR

LIPAYEV, V. V. and YASHKOV, S. F., EFTEKTIVNOST' METODOV ORGANIZATSII  
VYCHISLITEL'NOGO PROTSESSA V ASU, "Statistika," 1975 256 pp

of real time CP, the effectiveness of supervisory M with quantization of servicing with unlimited buffer memory (BM), effectiveness of priority M of operational supervision with unlimited waiting time, effectiveness of nonpriority M of supervision with limited BM, effectiveness of M of supervision with limited BM, the effectiveness of the M of outputting messages from the computer to subscribers, effectiveness of M of deterministic planning of BM.

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## ELECTRONICS AND MODELING. NO 9

Kiev ELEKTRONIKA I MODELIROVANIYE. VYP 9 [Electronics and Modeling. No 9] in Russian, Academy of Sciences Ukrainian SSR. Scientific Council on Problems in the Theory of Electrical Engineering and Electronics, Institute of Electrodynamics, Izd-vo Nauk Dumka, 1975, 148 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 5 1976 Abstract No 5G 634K by V. A. Garmash]

[Text] The articles of the collection are grouped into the following sections: theory of electronics and electrical engineering, machine analysis of electronic circuits and fields; specialized computers and electronic devices; problems of organizing hybrid and multiprocessor computer structures; computer methods, accuracy and reliability of electronic systems; experience in developing and using computers and systems.

1/1

RUMANIA

NICOLAU, EDMOND and POPOVICI, ALEXANDRU

INTRODUCTION INTO THE CYBERNETICS OF HYBRID SYSTEMS

Bucharest INTRODUCERE IN CIBERNETICA SISTEMELOR HIBRIDE [Introduction Into the Cybernetics of Hybrid Systems] in Rumanian, Izd-vo Ed Tehn, 1975 303 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G32 K by A. G.]

[Text] This book discusses both the necessary mathematical apparatus and the technical and engineering sides of the problem of planning and utilizing hybrid systems. Methods are described for quantization of signals used in discrete systems and a special chapter is devoted to methods of extrapolation and interpolation. The authors study in detail the question of hybrid modeling of various physiological processes. Among the elements of the hybrid systems, special chapters are devoted to functional transformers in hybrid systems, discrete filters, and transformers of continuous signals into discrete ones. The authors mention the special features of hybrid system computations, methods of storage and transformation of information, and 1/2

RUMANIA

NICOLAU, EDMOND and POPOVICI, ALEXANDRU, INTRODUCERE IN CIBERNETICA SISTEMELOR HIBRIDE, Izd-vo Ed Tekh, 1975 303 pp

processing of stochastic information in hybrid systems. They examine hybrid extremal systems, analyze the oscillational processes in hybrid systems and questions of optimizing them. The final chapter is devoted to investigating Walsh functions.

BULGARIA

UDC 62-50:007:62

YANAKIYEV, R.

BRIEF TERMINOLOGICAL DICTIONARY ON ELECTRONIC INFORMATION PROCESSING

Sofia KRAT'K TERMINOLOGICHEN RECHNIK PO ELEKTRONNA OBRABOTKA NA INFORMATSIYA in Bulgarian, Nauka i Izkustvo, 1973, 166 pp [Reviewed in NOVYYE KNIGI ZA RUBEZHOM in Russian, Vol B, No 1, 1975, 97 pp]

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G21RETS by V. N.]

[Text] The dictionary here reviewed systematizes terminology used in economic cybernetics, electronic information processing, machine programming and automated enterprise management systems. The dictionary consists of an introduction, three parts and an appendix. Part I contains 207 machine programming terms. Part II contains 1300 specialized terms on machine information processing in Bulgarian, Russian and English. Part III gives the generally accepted graphic interpretation of the most important terms such as program, punch card, memory unit, magnetic tape drive, etc.

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## UNIFORM COMPUTER SYSTEMS AND MEDIA. PART 2

Kiev ODNORODNYYE VYCHISLITEL'NYYE SISTEMY I SREDY, CH. 2 MATERIALY IV VSESOYUZHNOY KONFERENTSII, KIYEV, OKT 1975, AN USSR. IN-T ELEKTRODINAMIKI, IN-T KIBERNET, IN-T MAT [Uniform Computer Systems and Media, Part 2. Materials of the Fourth All-Union Conference, Kiev, Oct 75. Academy of Sciences of the Ukrainian SSR. Institute of Electrodynamics, Institute of Cybernetics, Institute of Mathematics] in Russian, Izd-vo Naukova Dumka, 1975 184 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELETEKHNIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B18K by M. S. Rusakova]

[Text] Part Two of the collection examines questions of creating hybrid computer media and structures and digital integrating structures (DIS). The group of reports reflects the state of the development of high productivity digital-analog computers. In a number of the reports studies were made of the problems of creating uniform DIS, the features of organizing computations in them and methods of computing their effectiveness. The collection also discusses achievements in the area of creating optoelectronic computer media and systems.

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## USSR

ODNORODNYYE VYCHISLITEL'NYYE SISTEMY I SREDY, CH. 2 MATERIALY IV VSESOYUZHNOY KONFERENTSII, KIYEV, OKT 1975, AN USSR, IN-T ELEKTRODINAMIKI, IN-T KIBERNET, IN-T MAT, Izd-vo Naukova Dumka, 1975 184 pp

The section on Hybrid Computer Media and Systems contains the following works: an analog-digital model for electromagnetic computations; general-purpose program of software of a hybrid computer system for solving boundary value problems; organization of a hybrid computer system with high-speed modeling medium; components of computers with mixed information display; unification of structures in continuous-impulse functional converters; modeling of network problems with negative branch lengths; organization of an effective process for solving complex boundary value problems on a hybrid computer system such as the "Network-Computer" (experience in using the ATsVK [analog-digital computer complex] "Saturn"); hybrid structures with high computational accuracy; the question of electronic modeling of combinatory problems; a specialized process for solving systems of linear algebraic equations; a hybrid computer on a base of modeling the medium of a variable structure; one structure of the analog processor of a control computer; questions of constructing a combined computer on the basis of a model of the YeS Computer series and a digital integrating structure; several features of planning

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USSR

ODNORODNYYE VYCHISLITEL'NYYE SISTEMY I SREDY, CH. 2 MATERIALY IV VSESOYUZHNOY KONFERENTSII, KIYEV, OKT 1975, AN USSR, IN-T ELEKTRODINAMIKI, IN-T KIBERNET, IN-T MAT, Izd-vo Naukova Dumka, 1975 184 pp

problem-oriented hybrid-type computers; structures and algorithms for debugging the specialized hybrid computer medium; one principle for design of digital-analog computer structures; the specialized hybrid computer "Ritm-2" for solving problems of optimal planning; the structure of hybrid functional converters based on digital extremers; a computer structure with programmable commutation for solving network optimization problems; stochastic hybrid computers with digital resolving elements; several questions in evaluating the accuracy of a specialized computer structure designed for solving a variational problem; synthesis of general-purpose multidimensional functional converters made from nonlinear elements; an integrating digital-analog complex; a hybrid multiplier-divider device with exponential scanning; hybrid computer media made from time-impulse scalars; the basic characteristics and requirements imposed on frequency-impulse computers of the closed type; the design principle of frequency-impulse devices of the closed type; a hybrid structure of the computer for evaluating the correlation function; use of uniform structures for organizing the discipline of expectation in priorities; a generalized formula for piecewise-polynomial approximation  
3/5

USSR

ODNORODNYYE VYCHISLITEL'NYYE SISTEMY I SREDY, CH. 2 MATERIALY IV VSESOYUZHNOY KONFERENTSII, KIYEV, OKT 1975, AN USSR, IN-T ELEKTRODINAMIKI, IN-T KIBERNET, IN-T MAT, Izd-vo Naukova Dumka, 1975 184 pp

and its realization in hybrid systems; an open functional converter made from linear elements of the parabolic type; a sequential functional converter made from nonlinear elements; selection of the structure of an extrapolating converter with frequency-impulse processing of digital information.

The section on Uniform Digital Integrating Structures contains the following works: the design and use of DIS; a uniform algorithm system for solving differential equations with nonlinear monitoring; investigation of the possibility of using the DIS for realization of a function for protecting networks with high and superhigh voltage; DIS in modeling systems; smoothing methods and their implementation using DIS; a functional model for uniform DIS; functional components for digital control computer structures with cyclic information processing; multichannel digital systems of continuous control and regulation based on uniform digital control structures; principles of design of components of uniform DIS; an integrator for a  
4/5

USSR

ODNORODNYYE VYCHISLITEL'NYYE SISTEMY I SREDY, CH. 2 MATERIALY IV VSESOYUZHNOY KONFERENTSII, KIYEV, OKT 1975, AN USSR, IN-T ELEKTRODINAMIKI, IN-T KIBERNET, IN-T MAT, Izd-vo Naukova Dumka, 1975 184 pp

uniform DIS with one-channel electronic commutation; the dynamic properties of the DIS.

The section on Opto-Electronic Computer Media and Structures contains the following works: features of the design of an image processor; certain aspects of the optoelectronic principle in bionic systems; a method for matched display of images in problems of filtration (optoelectronic aspect); design of uniform multivalued structures with the use of the tools of optoelectronics; building automatic equipment with an adjustable structure from holographic components; a schematic graphic-language translator for a micro-optoelectronic parallel processor; the theory and organization of a holographic operative memory; influence of the nonlinearity of the information carrier on the density of information recording; use of cathode ray technology and sign photodiode indicators in computers.

5/5

USSR

UDC 681.3(02)

METHODOLOGY FOR COMPUTATION AND AUTOMATION OF THE DESIGN OF DEVICES FOR MICROELECTRONIC DIGITAL COMPUTERS

METODY RASCHETA I AVTOMATIZATSIYA PROYEKTIROVANIYA USTROYSTV MIKROELEKTRONNYKH TsVM [Methodology for Computation and Automation of the Design of Devices for Microelectronic Digital Computers] in Russian, Academy of Sciences Ukrainian SSR, Scientific Council on the Problem "Cybernetics," Institute of Cybernetics, 1975 101 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B17K by M. S. Rusakova]

[Text] The collection contains the following articles: utilization of algorithms of the iterative type in a problem of cutting; about one method of isomorphic imbedding of graphs; the version of the solution to the problem of standardization; method of minimizing crossover connections in circuits; uniform programmable structure for solving combinatory logic problems on graphs and hypergraphs; heuristic method of constructing a minimal Euler graph for an unconnected graph with weighted edges; computation of an UHF circuit containing an annular bridge; computation of the operating mode of a linear asynchronous motor.

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USSR

UDC 681.3.01

PALAGIN, A. V., IVANOV, V. A., KURGAYEV, A. F. and DENISENKO, V. P.

MINICOMPUTER PRINCIPLES OF DESIGN AND PLANNING

Kiev MINI-EVM PRINTSIPY POSTROYENIYA I PROYEKTIROVANIYA [Minicomputer Principles of Design and Planning] in Russian, Izd-vo Naukova Dumka, 1975 200 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B21K by M. S. Rusakova]

[Text] The authors discuss the basic problems generated in the planning of modern minicomputers. Basic attention is paid to the questions of designing the architecture and structure of minicomputers and organization of control, including the synthesis of a command system, synthesis of the operational device with a regular structure, etc. They examine effective methods of raising the productivity of minicomputers with the aid of functional operators, and they examine questions of coding control information.

The book contains the following chapters: Chapter 1. Architecture and Structure of the Minicomputer. (features of the minicomputer; influence 1/3

USSR

PALAGIN, A. V., IVANOV, V. A., KURGAYEV, A. F. and DENISENKO, V. P., MINI-EVM PRINTSIPY POSTROYENIYA I PROYEKTIROVANIYA 1975 200 pp

of systems requirements on architecture and structure; basic features of planning; principles of structural organization). Chapter 2. System of Commands and its Organization (introductory remarks; address commands; organization of address commands; address-free commands; organization of address-free commands; input-output commands). Chapter 3. Organization of Control in the Minicomputer (levels of control; formats and methods of command coding; realization of principles of microprogrammed control; microdiagnostics; synthesis of microprogrammed automatic equipment with "strict" logic; computation of machine cycle).

Chapter 4. Service Software for the Minicomputer and Realization of Elementary Functions (types of software; optimization of the computations for elementary functions; expansion by Chebyshev polynomials; tabular-interpolation approximations; "digit-by-digit" methods; comparison of algorithms for computing elementary functions; use of the variable-step Newton interpolation polynomial with a variable step; realization of piecewise-linear 2/3



USSR

PALAGIN, A. V., IVANOV, V. A., KURGAYEV, A. F. and DENISENKO, V. P., MINI-EVM PRINTSIPIY POSTROYENIYA I PROYEKTIROVANIYA 1975 200 pp

interpolation with constant step). Chapter 5. Questions of the Organization of Control in Specialized Minicomputers (coding control information on the basis of the method of "compression"; evaluations of several methods of coding the address ensemble of messages; development of methods of converting a sequence of messages; method of coding the graph of S-codes; examples of hardware realization of a programmed control device).

3/3

USSR

UDC 62-50

Unsigned

#### OPTICAL AND ELECTRO-OPTICAL INFORMATION PROCESSING

Moscow OPTICHESKAYA I ELEKTROOPTICHESKAYA OBRABOTKA INFORMATSII [Optical and Electro-Optical Information Processing] in Russian, Academy of Sciences USSR, Ministry of Instrument Building, Means of Automation, and Control Systems USSR, Institute of Control Problems, "Nauka" Publishing House, 1975 190 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G15K from the resume]

[Text] This collection contains a brief presentation of some of the reports heard at the 4th All-Union Seminar on Optical and Electro-Optical Methods and Equipment for the Transmission, Conversion, Storage and Processing of Information (Jan 1973), organized by the Institute of Control Problems and the Scientific Council on Problems of Electrical Measurements and Measurement Information Systems, Acad. Sci. USSR. Problems are studied related to the construction of optical and electro-optical systems for information processing, from the selection of a structure and methods of coding of

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USSR

OPTICHESKAYA I ELEKTROOPTICHESKAYA OBRABOTKA INFORMATSII 1975 190 pp

information in the form of optical signals to the investigation of individual elements of such devices; electro-optical modulators, photoelectric converters, magnetic films with optical recording and readout. Significant attention is given to devices for input of optical information to electric devices. Certain new applications and characteristics of industrially produced devices are presented for electro-optical elements for transmission of electric signals, and individual theories and questions related to their construction and application are discussed. The collection is designed for scientific workers and engineers in the area of devices and systems for information processing, control and computer equipment.

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USSR

PROKOV'YEV, ANATOLIY VALENTINOVICH

Moscow ORGTEKHNIKA V ASU [Accounting and Business Machinery in Automated Management Systems] in Russian, "Znaniye" Publishing House, 1975 64 pp

[Abstract] Accounting and business machinery, or orgtekhnika [literally, organizational equipment or technology], can be defined as the hardware used in the preparation of documents and drawings; in duplication, processing, storage, and retrieval of information carriers; in recording, transmission, and display of data, etc. It is part of the hardware resources of automated control systems.

This booklet, which is intended for a wide range of engineering and technical works, is devoted to the problems of the combined use of orgtekhnika and computer technology in industrial management. It deals with the application of orgtekhnika to automated management systems in enterprises and sectors of industry and to automated scientific-technical information systems.

The following rule may be used to distinguish between orgtekhnika and computer technology: if a device is connected electrically to a computer, as is, for example, the Konsul-254 typewriter, which serves as an input-output unit for the Nairi-3 computer, then it is considered a component

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USSR

PROKOV'YEV, ANATOLIY VALENTINOVICH, ORGTEKHNIKA V ASU 1975 64 pp

part of the computer complex; if, on the other hand, an individual typewriter of the same kind is used in a plant administration office, then it is part of orgtekhnika. An automatic drafting machine operating under the control of inflexible programs written on attached information carriers, or even a drafting automaton that has its own specialized electronic calculator, falls under the category of orgtekhnika. However, an automatic drafting machine that is permanently connected to a general-purpose computer for which it serves as an output device, is viewed as part of the computer complex.

The assignment of a piece of equipment to the category of orgtekhnika rather than computer technology also depends on its portability and the possibility of using it at a work space. Hence, the term "office equipment" is often used abroad to designate orgtekhnika. In this sense, all keyboard calculator-computers would be classified as orgtekhnika.

The terms "office" or "intra-departmental" could also be applied to the communications channels used with orgtekhnika, which differ from ordinary ones in their limited long-distance capability. Thus, telegraph devices used for communication between the subdivisions of a single large enterprise are defined as orgtekhnika resources, whereas those used for direct communication

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USSR

PROKOV'YEV, ANATOLIY VALENTINOVICH, ORGTEKHNIKA V ASU 1975 64 pp

between the enterprise and a ministry are classified as normal means of communication.

USSR

UDC 651.2

ALFEROV, A. V., BRENER, V. S., KACHALINA, L. N. et.al.

ACCOUNTING AND BUSINESS MACHINERY IN CONTROL

Kiev MEKHAIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian ("New Books")  
No 2, Mar-Apr 76 p 77

[Review of book Orgtekhnik v Upravlenii [Accounting and Business Machinery in Control] by A. V. Alferov, V. S. Brener, L. N. Kachalina, et. al., under the editorship of L. N. Kachalina, Moscow, "Ekonomika" Publishing House, 1975 183 pp]

[Text] This book was prepared on the basis of theoretical investigations and practical experience in organizational planning, development and use of the accounting and business machinery in automated control systems [ASU]. Special attention is paid to the construction of rational technological processes for compiling, processing and reproduction of documentary information as well as improving accounting and business machinery under conditions of operating ASU. The book is intended for workers occupied with questions of scientific control of the administrative labor of institutes and enterprises, ministries and departments.

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USSR

UDC 62-50:007:65

LITVAK, I. I., LOMOV, B. F. and SOLOVEYCHIK, I. YE.

BASES OF CONSTRUCTING DISPLAY APPARATUS IN AUTOMATED SYSTEMS

Moscow OSNOVY POSTROYENIYA APPARATURY OTOBRAZHENIYA V AVTOMATIZIROVANNYKH SISTEMAKH [Bases of Constructing Display Apparatus in Automated Systems] in Russian, Izd-vo Sov Radio, 1975 368 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G799 K by S. R.]

[Text] The authors examine the basic directions in the development of modern systems of information display (IDS). They discuss the results of the latest research in engineering psychology which must be taken into account in selecting modes of exploitation and IDS parameters. Using examples they show the necessity and possibility of matching the characteristics of the human operator and the special features of the technical realization of various indicators. They examine questions of information coding transmitted by man for visual perception, and the requirements imposed on an information model. They analyze the classes and forms of the information models and

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USSR

LITVAK, I. I., LOMOV, B. F. and SOLOVEYCHK, I. YE., OSNOVY POSTROYENIYA APPARATURY OTOBRAZHENIYA V AVTOMATIZIROVANNYKH SISTEMAKH 1975 368 pp

also their elements. They evaluate the specific features of constructing display facilities for individual and collective utilization and versions of technical realization of these means, including devices for volume display as well as IDS based on utilization of physical principles. Figures 279; Tables 45; References 367.

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USSR

UDC 62-50:007:51

#### APPLIED QUESTIONS IN ENGINEERING PSYCHOLOGY

Taganrog PRIKLADNYYE VOPROSY INZHENERNOY PSIKHOLOGII [Applied Questions in Engineering Psychology] in Russian, 1975, Izd-vo Taganrog Radio Engineering Institute, 140 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G527 K]

[Text] None.

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USSR

UDC 007:001.8

Unsigned

THE USE OF COMPUTERS AND OPTIMIZATION IN SCIENCE AND PRODUCTION. ABSTRACTS OF REPORTS FROM CONFERENCE OF YOUNG SPECIALISTS, 30 May 1975

Novosibirsk PRIMENENIYE EVM I OPTIMIZATSIYA V NAUKE I PROIZVODSTVE in Russian, Novosibirsk Oblast Council of Scientific-Technical Societies, 1975 57 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 11 1975 Abstract No 11G607K by V. G.]

[Text] The collection contains 26 works: computer formation and analysis of a batch of requests at a branch scientific research organization, optimization of long-range plans for a branch scientific research institute, normalization of work on the creation and introduction of AMS [Automated Management Systems], a system for operative sampling of information in business, problems of tracking of the condition of health of the population, a library of programs for processing of information files.

Optimal planning of prestressed reinforced concrete beams, qualitative analysis in the sampling of prospective groups of stressed reinforcement  
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USSR

PRIMENENIYE EVM I OPTIMIZATSIYA V NAUKE I PROIZVODSTVE 1975 57 pp

elements, determination of stresses in the end portions of structures of type 800 concrete upon compression by self-anchoring reinforcement, optimal planning of a guy bridge with reinforced concrete rigidity beams are all described.

Studies include certain problems of development of AMS for a pool of construction machinery, optimal planning of structures using the method of random search, the "Akkord" system in Construction Trust No 30, AMS in Glavnovosibirskstroy, the use of computers for calculation of the load-bearing capacity of standard reinforced concrete pilings, the use of the Monte Carlo method for current planning of technical and economic indicators of a power system, the use of statistical methods in prediction, electric power consumption of a power system.

Studies are made of the software of an automated complex for calculation of plan technical-economic indicators of the operation of a regional power system, a program for selection of the composition of operating units at a station with uncertainty of the initial information, modeling of power characteristics of hydraulic units in algorithms for optimization of their  
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USSR

PRIMENENIYE EVM I OPTIMIZATSIYA V NAUKE I PROIZVODSTVE 1975 57 pp

modes, a program for selection of synchronous compensators for a hydroelectric power plant.

Problems are stated for operational accounting of technical and economic indicators of the Krasnoyarsk power system, construction of the characteristics of specific consumption of standard fuel at a thermoelectric power plant by the method of multifactor experimentation, prospects for industrial utilization of stereo television devices in the imaging of visual information, principles of construction of automata for sorting of coded objects, the use of computers in problems of automation of calculations with machine tractor station subscribers.

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USSR

UDC 681.3.01

OVCHINNIKOV, V. V., DSHKHUNYAN, V. L. and CHICHERIN, YU. YE.

PLANNING OF HIGH-SPEED MICROELECTRONIC DIGITAL DEVICES

Moscow PROYEKTIROVANIYE BYSTRODEYSTVUYUSHCHIKH MIKROELEKTRONNYKH TSIFROVYKH USTROYSTV [Planning of High-Speed Microelectronic Digital Devices] in Russian, Izd-vo Sov Radio, 1975, 288 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B38K by M. S. Rusakova]

[Text] The authors examine questions of planning high-speed microelectronic digital devices (HMDD) which have a maximal speed of error-free transmission of discrete information along internal communication channels with allowance for the characteristics of bipolar high-speed integrated logic circuits (HILC) used.

In Chapter 1, Basic Problems of Planning HMDD and HILC, the authors examine the structural and technological characteristics of

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USSR

OVCHINNIKOV, V. V., DSHKHUNYAN, V. L. and CHICHERIN, YU. YE., PROYEKTIROVANIYE BYSTRODEYSTVUYUSHCHIKH MIKROELEKTRONNYKH TSIFROVYKH USTROYSTV, 1975, 288 pp [From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMekhANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B38K]

HILC and HMDD and demonstrate the necessity of expanding the logic possibilities of the logic elements of the HILC by creating multifunctional elements of tabular type and elements of threshold logic. Chapter 1 contains the following basic sections: classification and analysis of the HILC characteristics.

Chapter 2, Engineering Circuit Planning of HILC, gives materials on improving the engineering circuit solutions of elements of Boolean and threshold logic, as well as the principle elementary circuits of a series of elements. Chapter 3, Basic Characteristics of the HILC and HMDD, is devoted to an investigation of the basic technological characteristics of the HILC elements by allowing for their operation on one another and on various assembly joints. Chapter 3 contains the following sections: statistical characteristics of HILC; dynamic

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USSR

OVCHINNIKOV, V. V., DSHKHUNYAN, V. L. and CHICHERIN, YU. YE., PROYEKTIROVANIYE BYSTRODEYSTVUYUSHCHIKH MIKROELEKTRONNYKH TSIFROVYKH USTROYSTV, 1975, 288 pp [From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMekhANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B38K]

dynamic characteristics of HILC.

Chapter 4 describes the methods of logic planning of HMDD operating in positional and nonpositional codes. These latter permit raising the reliability of storage and conversion of information with the aid of the proper coding in the remaining classes. Chapter 4 includes the following sections: principles of logic planning of HMDD; planning of arithmetic HMDD; planning of circuits of apparatus monitoring; planning of registers; dual counters; decoders; planning of arithmetic HMDD operating in nonpositional code.

Chapter 5 describes the methods of apparatus reserve of the HMDD and gives examples of realization of the reserved devices which

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USSR

OVCHINNIKOV, V. V., DSHKHUNYAN, V. L. and CHICHERIN, YU. YE., PROYEKTIROVANIYE BYSTRODEYSTVUYUSHCHIKH MIKROELEKTRONNYKH TSIFROVYKH USTROYSTV, 1975, 288 pp [From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5, 1976 Abstract No 5B38K]

ensure the necessary reliability of HMDD operation. Chapter 5 contains the following sections: classification of methods of raising HMDD reliability; static methods of reserve; method of reserve utilizing functional coherence of the circuits; a multichannel method of reserve.

Chapter 6, Engineering Circuit Structure of HMDD, is devoted to questions of HMDD construction by allowing for the requirements imposed on the assembly connections of the HILC elements and also of elements having a signal propagation delay in the range of 1-3 nanoseconds.

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USSR

UDC 681.3(02)

CHAPTSOV, R. P. and NIKITIN, G. A., Editors

COMPUTER TECHNOLOGY

Chelyabinsk SB NAUCH TR CHELYABINSK POLITEKHN IN-T [Collection of Scientific Works of Chelyabinsk Polytechnic Institute] in Russian No 170, 1975 197 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B16K by M. S. Rusakova]

[Text] This collection examines the problems of organizing computerized automated design systems, discusses the results of investigating the characteristics of computer components and studies questions of planning microprogram control automatic equipment, monitoring and diagnostics of technical systems, and design and analysis of complex information processing systems.

The collection contains the following articles: organization of a system of algorithmic software for the process of automated design of ACS [automated control systems]; realization of machine-independent principle of organizing software for systems of automated design; evaluation of the lengths of segments and free segments for programs stored in the operative memory; evaluation of the access time to the files stored on magnetic disks.

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USSR

CHAPTSOV, R. P. and NIKITIN, G. A., SB NAUCH TR CHELYABINSK POLITEKHN IN-T  
No 170, 1975 197 pp

It includes the works: hardware methods of accelerating addition of numbers in the computer; synthesis of control automata by parallel algorithms; minimization of the algorithms of control devices; organization and evaluation of the effectiveness of systems of noise-stable coding on the basis of generalized magic designs; computation of high-order determinants with the use of directed graphs; construction features of control automata using multistable memory elements.

The following questions are studied: computerized investigation of the structure of optimal strategies for control of the heating process; debugging of self-coding programs on the Nairi computer; a device for determining the boundaries of the region of effectiveness of continuous objects; choice of recognition algorithms for diagnosing linear ACS; a teaching algorithm for ACS of technological processes; an ACS for a pipe rolling mill; analysis of signals of a phase radio range finder.

Also included are the following articles: optimization of the parameters of an energy source regulator; several questions concerning the automation of determining the phase difference in phase radio range finders; one  
2/3

USSR

CHAPTSOV, R. P. and NIKITIN, G. A., SB NAUCH TR CHELYABINSK POLITEKHN IN-T  
No 170, 1975 197 pp

approach to synthesizing autonomous devices for recording information on magnetic tape; a device for investigating the static parameters of cylindrical magnetic films; increasing the accuracy of determining the parameters of the useful signal in the presence of noises; determination of the coordinates of objects of the locale by a television image; one method of removing dynamic error given linear averaging of the measurement results.

The collection contains the articles: one method of compensating angular errors in a TV-gauge of the coordinates of objects; correction phase errors of radio navigation systems with digital information processing; measurement of rapidly changing linear translations.

3/3

USSR

UDC 62-50:007:65

SYSTEMS AND MEANS OF AUTOMATIC CONTROL

Kiev SISTEMY I SREDSTVA AVTOMATICHESKOGO UPRAVLENIYA [Systems and Means of Automatic Control] in Russian, Izd-vo Ministry of Instrument Construction, Means of Automation and Control Systems USSR, Institute of Automation, 1974, 142 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G595 K by S. R.]

[Text] Articles are published on the scientific and technical cooperation between specialists of the Institute of Automation of the Ministry of Instrument Construction Means of Automation and Control Systems USSR and representatives of various organizations of other governments, mainly member nations of the Council for Mutual Economic Aid, in the field of creating more perfect systems and instruments for automation and control of technological processes and production. They characterize institute's developments in the following areas: hydraulic systems for controlling the stops of steel casting ladles at foreign metallurgical plants constructed with the aid of the USSR; force measuring sensors on cement-free tensoresistors for monitoring technological processes in ferrous metallurgy; introduction 1/2

USSR

SISTEMY I SREDSTVA AVTOMATICHESKOGO UPRAVLENIYA 1974 142 pp

of electronic machinery for monitoring the microclimate in the shops of a polyamide fibers plant, installation and exploitation of the automated control systems for gas-turbine installations, etc.

USSR

UDC 007.5:50

TECHNICAL AND MATHEMATICAL TOOLS FOR ORGANIZING DIALOG IN COMPUTER SYSTEMS

Kiev TEKHNIЧЕСКИЕ I MATEMATICHESКИЕ SREDSTVA ORGANIZATSII DIALOGA V VYCHISLITEL'NYKH SISTEMAKH [Technical and Mathematical Tools for Organizing Dialog in Computer Systems] in Russian, published by the Znaniye [Knowledge] Society of the Ukrainian SSR, 1975, 30 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 5 1976 Abstract No 5G 713P by V. A. Garmash]

[Text] The brochure discusses the questions of constructing dialog systems, the use of dialog in an automated planning complex, organization of a dialog mode for control of technological processes, mathematical means of organizing dialog, technical facilities for processing information in dialog systems, and input-output of information.

1/1

USSR

UDC 681.3.01

KRUG, YE. K. and ARTAMONOV, YE. I.

QUESTIONS OF PLANNING SPECIALIZED COMPUTERS

Moscow VOPROSY PROYEKTIROVANIYA SPETSIALIZIROVANNYKH VYCHISLITEL'NYKH USTROYSTV [Questions of Planning Specialized Computers] in Russian, Institute of Problems of Control, 1974 71 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMЕKHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 5 1976 Abstract No 5B39K by M. S. Rusakova]

[Text] The authors examine questions of planning specialized computers associated with the development of technical requirements and structures of these devices. They note the features of compiling the technical requirements. They suggest a method of planning the structures of specialized computers. They systematize the procedures of realizing the arithmetic operations and the conversion operations. They examine operations with the algorithm of functioning of the computers and the questions of synthesizing the structures of the specialized sequential-action computers. They give examples of planning specific specialized computers.

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USSR

KRUG, YE. K. and ARTAMONOV, YE. I., VOPROSY PROYEKTIROVANIYA SPETSIALIZIROVANNYKH VYCHISLITEL'NYKH USTROYSTV 1974 71 pp

The book contains the following four chapters. Chapter 1. Features of Planning Specialized Computers (features of specialized computers; stages of planning and criteria of evaluating specialized computers; choice of basic characteristics of specialized computers; features of developing the technical requirements for the devices used in complex control systems). Chapter 2. Methods of Executing Arithmetic Operations and Conversion Operations (conversion and storage of information; arithmetic operations; systemization of procedures for executing the arithmetic operations and conversion operations).

Chapter 3. A Method of Planning Specialized Computer Structures (operations of conversion of algorithms for specialized computer functioning; synthesis of local specialized computer structures; method of planning specialized computer structures; automation of the process of planning local structures. Chapter 4. Planning Specialized Computer Structures (digital system of control of the processes of mixing petroleum products; structure of a multichannel computer).

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USSR

UDC 681.3:51.01:801:164

MACHINE TRANSLATION AND AUTOMATION OF INFORMATION PROCESSES. COLLECTION OF WORKS

Moscow MASHINNY PEREVOD I AVTOMATIZATSIYA INFORMATSIONNYKH PROTSESOV. SB. STATEY [Machine Translation and Automation of Information Processes. Collection of Works] in Russian, State Commission on Science and Technology of the Council of Ministers USSR, Academy of Sciences USSR, All-Union Center of Translations of Scientific and Technical Literature and Documentation, 1975 211 pp

[From REFERATIVNYY ZHURNAL, AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKNIKA No 5 1976 Abstract No 5B194K by V. A. Garmash]

[Text] The collection consists of two parts: the first part contains articles on questions of machine translation and the second -- articles on questions of constructing an automated system of information from the translations. The articles of the first part examine the structure of existing machine translation systems, study developed experimental systems, discuss the principles of an approach to solving this problem, and describe methods of constructing frequency and auxiliary glossaries for machine translation.  
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MASHINNYI PEREVOD I AVTOMATIZATSIYA INFORMatsIONNYKH PROTSESSOV. SB. STATEY  
1975 211 pp

The second part analyzes modern technology for producing translations and the possibility of improvement based on advanced technology and the use of computers. General questions of an automated system of translations of scientific and technical literature are examined, as are individual questions of exploitation of scanning systems (in particular, the problem of correcting distorted information) and problems of modeling the scanning process.

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UDC 007.5:621.38

COMPUTER TECHNOLOGY, RADIO ENGINEERING, RADIO MEASUREMENTS AND MAGNETIC MATERIALS. PART 2

Krasnoyarsk VYCHISLETEL'NAYA TEKHNKA, RADIOTEKHNKA, RADIOIZMERENIYA, MAGNITNYYE MATERIALY. CH 2 [Computer Technology, Radio Engineering, Radio Measurements and Magnetic Materials. Part 2] in Russian, Academy of Sciences. Siberian Branch. Institute of Physics, Krasnoyarsk Region Administration of the All-Union Scientific and Technical Society of Radio Engineering, Electronics and Communication, 1975 202 pp

[From REFERATIVNYY ZHURNAL, KIBERNETIKA No 12 1975 Abstract No 12G862 K by V. G.]

[Text] The collection contains 30 papers devoted to the technology of semiconductor production, the physical properties of magnetic materials, and the use of new materials in computer technology, radio measurements and radio engineering.

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CSO: 1863

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